IV. TRANSPORTATION FACILITIES, SERVICES AND MOBILITY IMPACTS

IV. TRANSPORTATION FACILITIES, SERVICES AND MOBILITY IMPACTS

A. PURPOSE

The purpose of this chapter is to provide a summary of travel forecasts performed for the alternates studied and the resulting highway and transit operations. Existing (1998) and 2025 forecasts are provided for the different transit and highway alternates. Traffic operating along I-270 and US 15 resulting from projected household and employment growth in the project area is also provided.

B. ALTERNATES STUDIED

The purpose of this chapter is to provide a summary of highway and transit forecasts performed for the final set of alternates and the resulting transportation system operations. The alternates were developed through a series of community input/public workshops. The alternates are described in Section II.D and named as follows:

- Alternate 1: No-Build Alternate
- Alternate 2: Transportation System Management/Transportation Demand Management (TSM/TDM) Alternate
- Alternate 3A: Master Plan High Occupancy Vehicle (HOV)/Light Rail Transit (LRT) Alternate
  Alternate 3B: Master Plan HOV/ Bus Rapid Transit (BRT) Alternate
- Alternate 4A: Master Plan General-Purpose/LRT Alternate
  Alternate 4B: Master Plan General-Purpose/BRT Alternate
- Alternate 5A: Enhanced Master Plan HOV/General-Purpose/LRT Alternate
  Alternate 5B: Enhanced Master Plan HOV/General-Purpose/BRT Alternate
  Alternate 5C: Enhanced Master Plan HOV/General-Purpose/Premium Bus Alternate

Throughout this chapter, projected transit ridership, travel times and other characteristics are provided for all LRT Alternates (i.e., Alternates 3A, 4A and 5A) as a group since the data results are similar for all of the LRT Alternates. Likewise, results for the BRT Alternates (i.e., Alternates 3B, 4B and 5B) are provided as a group.

Results for the highway-only alternates are also provided in groups since projected AM and afternoon peak hour highway travel is forecasted to be similar for the No-Build and TSM/TDM Alternates (Alternates 1 and 2, respectively), Alternates 3A/B, 4A/B and 5A/B/C.

C. TRAVEL DEMAND METHODOLOGY

1. Travel Demand Forecasting Model

A travel demand forecasting model was developed to estimate the effects of the alternates considered on the transportation operations using year 2025 land use forecasts (MWCOG Round 6.2 Cooperative Forecast). The model, which was provided by the Metropolitan Washington

Council of Governments (MWCOG), has been specifically tailored for the I-270/US 15 Multi-Modal Corridor Study. The model used for this analysis is a hybrid of the original model developed for the I-270 study in 1992 and the current conformity Version 1 Model. The model structure underwent a validation effort, primarily focused on this corridor, to ensure that the model adequately reflected the travel patterns in the corridor.

The travel demand forecasting model follows the standard four step sequential demand forecasting process: trip generation, trip distribution, mode choice and trip assignment. The only added step that the model incorporates is a feedback loop into trip distribution following the first iteration of trip assignment.

To accommodate the multi-modal alternates, there are two different trip assignments, one for highway and one for transit. The highway assignment is created using an iterative capacity restraint assignment process; transit trips are assigned to the fastest available path. Transit trips are assigned based on walk access and drive access transit trips, which are determined by the mode choice model.

The model provided 2025 forecasts of weekday average daily traffic (ADT) for the facilities of interest in the corridor. Post-processing procedures based on the techniques documented in the *Highway Traffic Data for Urbanized Area Project Planning and Design* (NCHRP-255) were used to refine those results to make them more useful for project planning. The post-processing procedures outlined here were based on SHA guidelines and were reviewed and approved by SHA.

After trip tables for an alternate were assigned, total non-directional link ADT volumes for the links composing pre-selected screenlines along I-270 and US 15 were recorded. These screenlines included I-270, US 15 and competing arterials. Next it was confirmed that the correct future capacities were attributed to links making up the screenlines. Refined link forecasts were calculated based on relative capacity of links comprising the screenline, and then ADT turning movements were calculated. Peak hour volumes were then derived for both the AM and PM weekday time periods. The peak hour calculation took into account future spreading of the peak period and the relationship between the peak period and the peak hour. Turning movements at each I-270 interchange were adjusted to achieve projected mainline peak hour volumes. Final traffic forecasts were compared to current patterns and checked for reasonableness.

2. Model Assumptions

As shown in **Table IV-1**, several assumptions were developed related to land use, highway and transit networks, LRT, BRT, Premium (Express) Bus, and feeder bus characteristics. These assumptions, which were developed by the Project Team with the concurrence of the I-270/US 15 focus group, provided the basis for the travel forecasting models and the alternates that were analyzed by the models. These assumptions were developed to allow for the highest reasonable transit use forecast for each alternate.

TABLE IV-1
PROJECT ASSUMPTIONS

Item	Assumption
Land Use	Round 6.2 Regional Cooperative Forecasts (2025)
Highway and Transit Network	2000 Regional Constrained Long Range Plan
Headways	
LRT	8 minutes
BRT	Headway to accommodate forecasted ridership based on vehicle capacity: 2 minute to 30 minute headways assumed
Premium Bus	Headway to accommodate forecasted ridership based on vehicle capacity
Feeder Bus	Initial: Feeder bus route network in each alternate have the same routes, geographical coverage and headways in order to allow a relative travel demand comparison and consistency between the build alternates and the No-Build Alternate. Final: Headways modified to reflect ridership
Maryland Area Rail Commuter (MARC) Service	MARC: Headways recoded to year 2000 service levels: 24 minutes Frederick extension coded as skip-stop with 40 minute headways
Average transit travel speeds, including station stops.	LRT and BRT 22 mph Premium Bus 30 mph MARC 53 mph
Signal preemption at crossings	Yes
Parking	Unconstrained (no parking charges)
Fare Structure	
LRT, BRT, Premium Bus	¾ Metrorail fare
MARC	same as existing MARC fare
Drive Access	Auto connect coding consistent with MWCOG coding conventions.

***Source**: I-270 Project Team with concurrence of the I-270/US 15 focus group.*

D. TRANSIT SERVICE AND RIDERSHIP IMPACTS

1. Existing Service

a. MARC

Commuter rail service is available in the Corridor through MTA's MARC system. MARC offers service from Martinsburg, West Virginia through Point of Rocks, Maryland to Washington, DC. The stations along this corridor are primarily oriented toward commuters working in downtown Washington, DC, as well as commuters who work in Rockville, Silver Spring or other locations along the Metrorail system (through transfers made in Rockville, Silver Spring and at Union Station). The MARC Brunswick line had service extended to Frederick in December 2001. Currently, approximately 2,524 commuters board MARC trains in the project area during the AM peak period and 5,047 riders daily.

b. Metrorail

The northwestern terminus of Washington Metropolitan Area Transit Authority (WMATA's) Metrorail Red Line system is the Shady Grove Metro Station, located at the southern end of the project area. Direct connections to Metrorail from MARC are available in Rockville, and at

Union Station. Metrorail provides service to the south, but does not currently provide service into or through the project area. The Shady Grove Metro Station currently has 5,791 parking spaces available, with a total of 7,800 spaces anticipated by 2010. Currently, approximately 8,301 passengers board Metro at the Shady Grove Metro Station and the Rockville Metro Station during the average weekday AM peak period.

c. Metrobus

Metrobus service provided by WMATA primarily serves the areas south of the Shady Grove Metro Station, serving approximately 14,369 riders per day.

d. Ride-On

Montgomery County provides bus service within the project area via the Montgomery County Ride-On system, which generally operates in support of Metrorail, Metrobus and MARC services. In the Gaithersburg/northern Rockville area, Ride On serves approximately 26,000 AM peak period riders.

e. TransIT

Approximately 929 riders per day use the Frederick County TransIT local bus system. This system operates primarily within the City of Frederick, but also provides service to other locations within Frederick County, such as the Francis Scott Key Mall.

f. Other Bus Service

MTA has a contract for a privately operated commuter bus service (#991) between Hagerstown, Frederick and the Shady Grove Metro Station. This service currently transports approximately 95 riders during the average weekday AM peak period.

2. Travel Time

The effectiveness of transit service is dependent upon several factors including geographic coverage, hours of operation and frequency of service, door-to-door travel times, travel time reliability, number and convenience of transfers required, comfort and safety. A useful indicator of quality of service is travel time savings. Travel time savings indicates the amount of time saved by commuters in taking transit with the proposed improvements for each alternate to their destinations as compared to the No-Build alternate. **Table IV-2** illustrates projected travel time reductions for daily work trips relative to the No-Build Alternate for the year 2025. **Figure IV-1** provides the same travel time information as a graphic. The times presented in these exhibits represent the transit in-vehicle time and the estimated time that it takes to wait for a transit vehicle. In some cases, the wait time can be 30 minutes or more. These exhibits indicate the largest savings of in-vehicle travel time occur as a result of the BRT Alternate, which provides more than 30 minutes of potential travel time savings using transit for work trips (89,200). The Premium Bus Alternate provides the next highest number of trips that save 30 minutes or more (53,400). Savings at five-minute intervals from 5 to 30 minutes are also presented. For 1 to 20

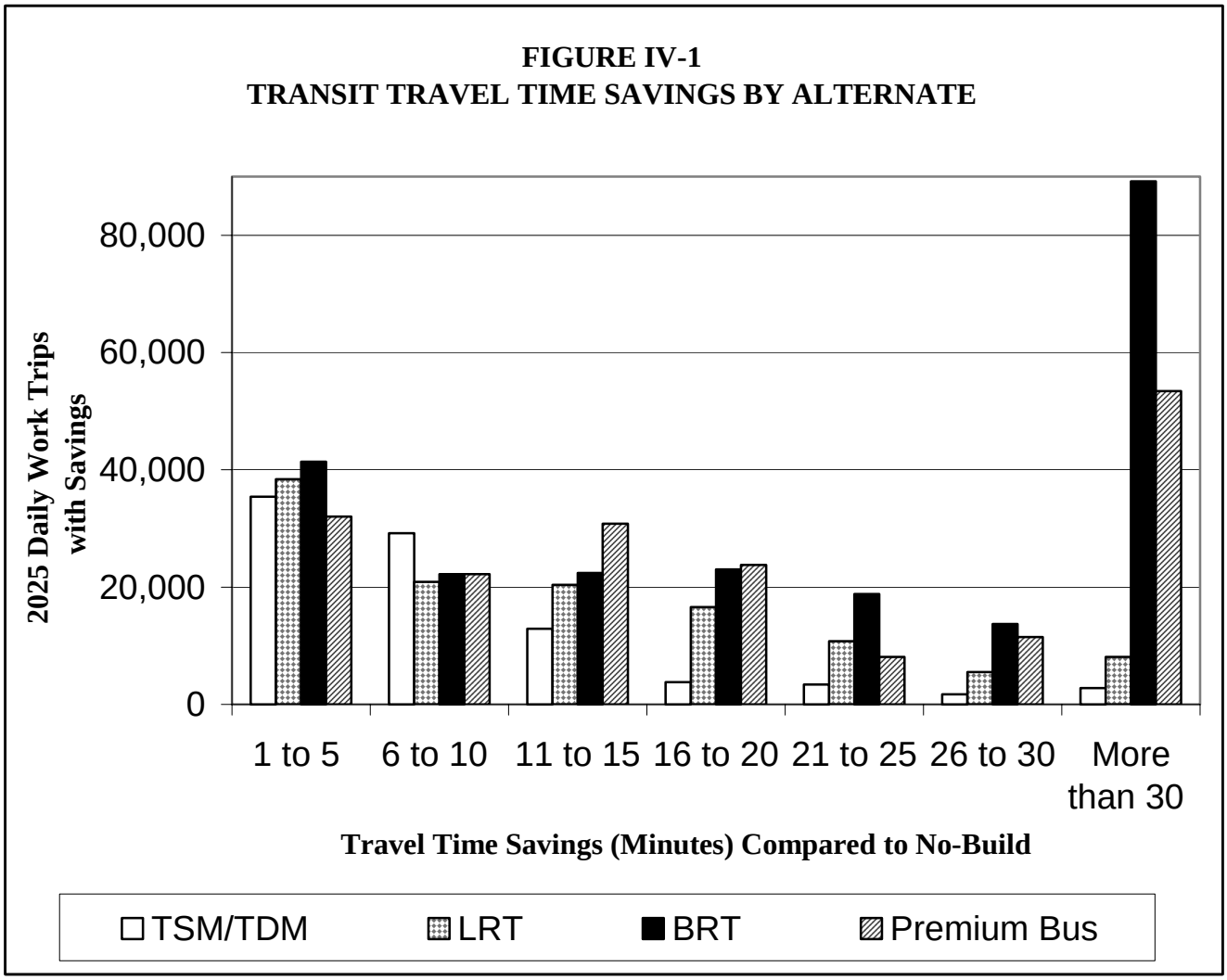
minutes of time saved the LRT Alternates appear to provide the same order of magnitude of time savings as the BRT and Premium Bus Alternates.

TABLE IV-2
POTENTIAL DAILY WORK TRIP MARKET WITH REDUCTIONS IN TRANSIT TRAVEL TIME RELATIVE TO ALTERNATE 1 (NO-BUILD) FOR 2025

Alternate	1 to 5 Minutes Saved	6 to 10 Minutes Saved	11 to 15 Minutes Saved	16 to 20 Minutes Saved	21 to 25 Minutes Saved	26 to 30 Minutes Saved	More than 30 Minutes Saved	Total
TSM/TDM	35,400	29,200	12,900	3,800	3,400	1,700	2,800	89,200
LRT	38,400	20,900	20,400	16,600	10,800	5,500	8,100	120,700
BRT	41,400	22,200	22,400	23,000	18,800	13,700	89,200	230,700
Premium Bus	32,000	22,200	30,800	23,800	8,100	11,500	53,400	181,800

Note: *Door to door travel time for trips whose origin or destination is in project area.*
Source: *MWCOG Travel Forecasts April 2001 – July 2001*

FIGURE IV-1
TRANSIT TRAVEL TIME SAVINGS BY ALTERNATE



While it is difficult to quantify the overall quality of service provided for all trips by an alternate, it is possible to develop measures that highlight the difference between options for selected trips. A useful indicator for this purpose is the transit travel time between various locations. Transit travel times are important since they are the key determinate of transit patronage for transit improvements. As travel time on transit decreases for a given trip, reflecting an improvement in transit service, the number of people using transit increases. **Table IV-3** provides travel times from selected origins within the project area to several key employment centers for each of the alternates studied and provides travel times for individuals who drive alone or with one passenger (low occupancy vehicle (LOV)) and those who carpool or vanpool (HOV). The origins are Germantown, Clarksburg and Frederick City, while the destinations are downtown Washington (Connecticut Avenue/K Street), Bethesda, the Life Sciences Center, Germantown and the Rockville Town Center. The travel times are provided separately for those who walk from home to board their first transit vehicle and for those who drive to a park and ride facility to board transit.

TABLE IV-3
YEAR 2025 PROJECTED TRAVEL TIME (IN MINUTES) BETWEEN SELECTED ORIGINS AND DESTINATIONS

Origins	Destinations	Transit via Walk Access [1]					Transit via Auto Access [2]					Low Occupancy Vehicle [3]					High Occupancy Vehicle [4]				
		Alternates					Alternates					Alternates					Alternates				
		1	2	3A, 4A, 5A	3B, 4B, 5B	5C	1	2	3A, 4A, 5A	3B, 4B, 5B	5C	1	2	3A, 4A, 5A	3B, 4B, 5B	5C	1	2	3A, 4A, 5A	3B, 4B, 5B	5C
Germantown	Downtown DC (Connecticut Avenue and K Street)	78	86	76	77	55	62	62	75	59	62	78	78	76	76	76	70	70	64	64	63
Germantown	Bethesda	64	72	62	63	41	48	48	61	40	41	50	50	49	49	48	42	42	35	35	34
Germantown	Rockville Town Center	44	52	46	47	25	32	32	33	33	33	28	28	27	27	27	26	26	19	19	19
Germantown	Life Sciences Center	36	29	29	36	30	52	38	28	40	42	18	18	16	16	16	18	18	13	13	13
Clarksburg	Downtown DC (Connecticut Avenue and K Street)	99	70	83	86	57	71	71	80	83	54	87	87	82	82	82	79	79	69	68	68
Clarksburg	Bethesda	62	51	69	49	43	57	57	66	46	40	59	59	54	53	53	51	51	40	40	39
Clarksburg	Life Sciences Center	79	51	36	46	32	61	49	33	43	29	27	27	21	20	21	27	27	18	17	18
Clarksburg	Germantown	50	34	17	18	12	N/A	N/A	N/A	N/A	9	11	11	8	7	8	11	11	8	7	8
Frederick City	Downtown DC (Connecticut Avenue and K Street)	109	108	109	109	102	110	110	110	110	104	110	110	104	108	104	109	109	88	87	88
Frederick City	Bethesda	95	94	95	95	89	96	96	96	96	91	88	88	81	87	79	80	80	59	59	58
Frederick City	Rockville Town Center	75	75	75	75	72	76	76	76	76	74	66	66	59	65	59	64	64	43	43	43
Frederick City	Life Sciences Center	101	100	97	94	93	105	110	98	96	95	57	57	48	55	48	57	57	37	37	37
Frederick City	Germantown	61	61	61	66	58	62	62	62	68	60	46	46	34	43	34	46	46	28	28	28

Notes: *1. Travel times shown include time to access the transit vehicle via walking to the boarding location.*
2. Travel times shown include time to access the transit vehicle via driving to the boarding location.
3. Low occupancy vehicle is defined as a vehicle with two or less occupants (driver alone or driver with one passenger).
4. High occupancy vehicle is defined as a vehicle with driver and two or more passengers.

Source*: MWCOG Travel Forecasts 4/2001-7/2001*

a. Results: Germantown

Figure IV-2 shows the travel time for individuals who both walk and drive to their first transit vehicle in Germantown, and are destined for downtown Washington (Connecticut Avenue/K Street), Bethesda, Rockville Town Center, and the Life Sciences Center. This data is shown as bars on the chart. As a comparison, LOV and HOV travel times for those destinations are drawn as horizontal lines across the bars to show the travel time if an individual were to take an automobile the entire distance for a comparable trip. For trips to downtown Washington, walk access transit travel times for No-Build, LRT and BRT are all approximately 76 to 78 minutes, with drive access travel times approximately 59 to 62 minutes. The Premium Bus Alternate generally yields the shortest travel times for each alternate and mode.

The transit travel time to Bethesda and Rockville via auto access is usually faster than transit travel time via walk access. HOV travel time is the fastest way to reach either Bethesda or Rockville, and the Premium Bus Alternate is generally the fastest transit alternative, and is faster than driving alone. The No-Build transit travel time is faster than the TSM/TDM travel time for trips to downtown Washington, Bethesda, and Rockville due to a change in individual bus routes serving the Germantown area and feeding the Shady Grove Metro Station for the TSM/TDM alternate.

For trips from Germantown to the Life Sciences Center, the BRT Alternate and No-Build show the highest walk access transit travel times, followed by Premium Bus, LRT and the TSM/TDM Alternates. The drive access transit travel times were generally higher. As a comparison, LOV and HOV travel times were at least 15 minutes faster than the fastest transit alternates. Overall, walk access transit trips to the Life Sciences Center are the faster than drive access transit trips, however, the trip still takes twice as long as driving an automobile the entire trip.

b. Results: Clarksburg

Figure IV-3 shows travel times for individuals who both walk and drive to their first transit vehicle in Clarksburg, and are destined for downtown Washington (Connecticut Avenue/K Street), Bethesda, the Life Sciences Center, and Germantown (Note: transit travel times via auto access are not applicable for trips from Clarksburg to Germantown). For walk and drive access transit trips to downtown Washington, Premium Bus is fastest at under an hour, followed by the TSM/TDM and No-Build (auto access only) Alternates at approximately 70 minutes. LRT and BRT take approximately 82 to 85 minutes, while No-Build (walk access) is well over an hour and a half. Premium Bus is approximately 30 minutes faster than the comparable travel time for LOV, while transit time with the TSM/TDM Alternate is approximately 10 minutes faster than the LOV time. The remaining transit alternates are generally slower than the LOV time.

For trips to Bethesda, Premium Bus, TSM/TDM and BRT are all within approximately 10 minutes of each other, with Premium Bus again being the fastest alternate. These three transit alternates also provide faster travel times than LOV. LRT provides the slowest travel time at almost 70 minutes. For trips to the Life Sciences Center, the LOV travel time is faster than the alternates by at least 10 minutes or more. However, Premium Bus provides the fastest transit

FIGURE IV-2
YEAR 2025 PROJECTED TRAVEL TIME BY ALTERNATE
TRAVELING FROM GERMANTOWN

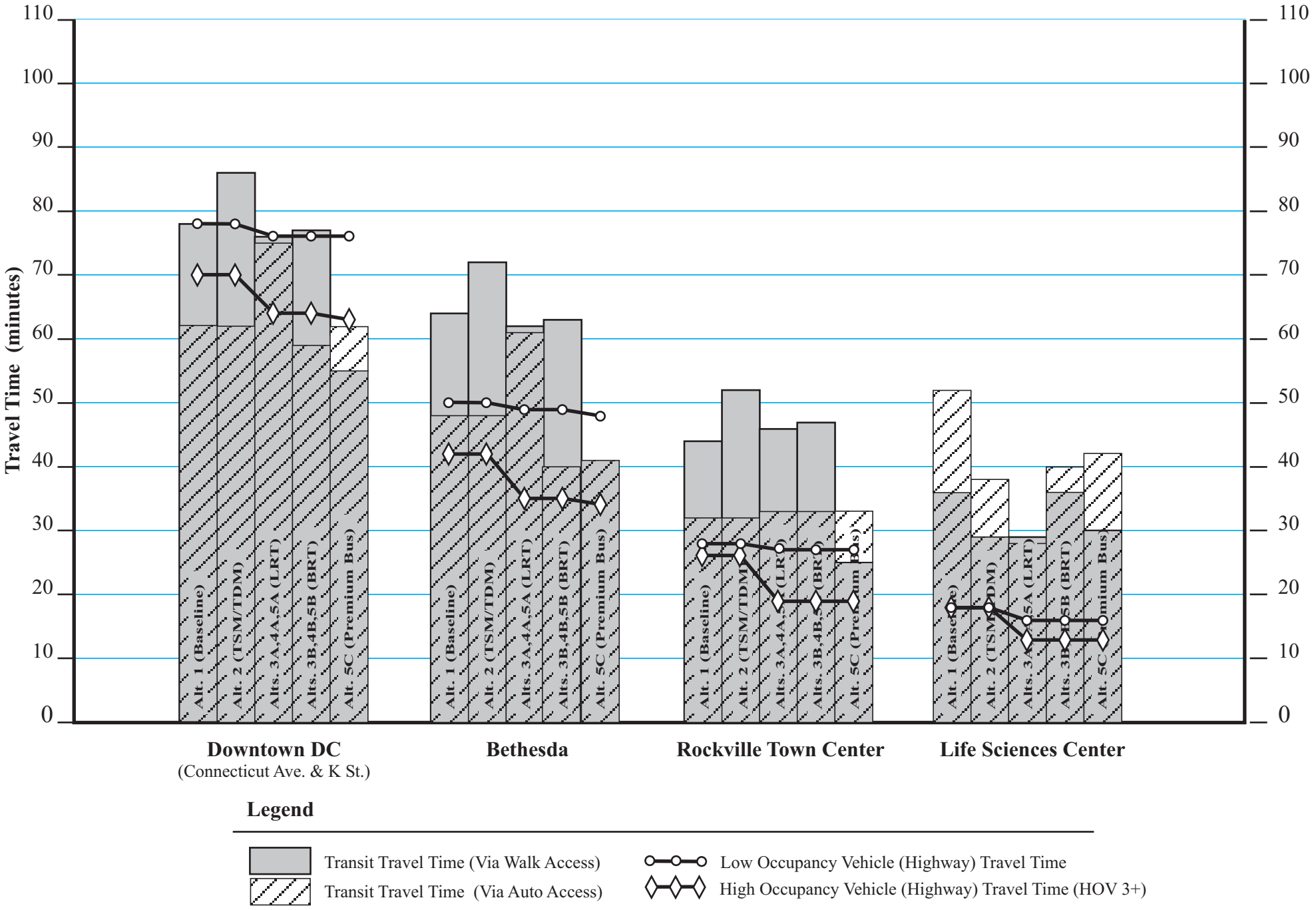
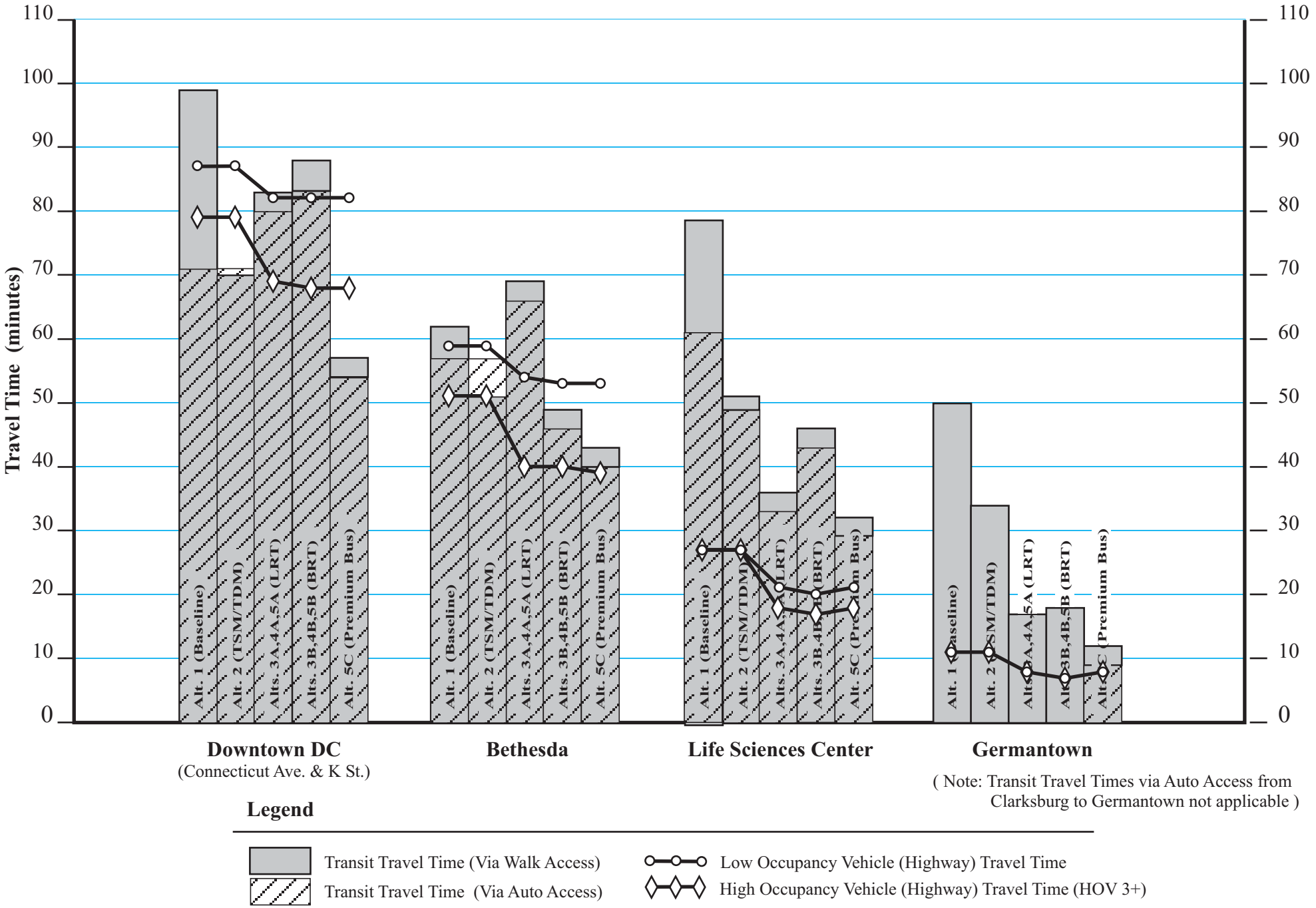


FIGURE IV-3
YEAR 2025 PROJECTED TRAVEL TIME BY ALTERNATE
TRAVELING FROM CLARKSBURG



trips at just over 30 minutes. All alternates provide slower trips than LOV, which provides travel times of roughly 20 minutes.

Trips to Germantown are fastest overall. No-Build transit travel to Germantown is slowest at 50 minutes, while Premium Bus is fastest at approximately 11 minutes. LRT and BRT provide similar travel times at approximately 16 to 17 minutes. LOV and HOV are faster, at approximately eight minutes, than all the alternates. In general, to all destinations from Clarksburg, Premium Bus provides the fastest transit travel time.

c. Results: Frederick

Figure IV-4 shows travel times for individuals who both walk and drive to their first transit vehicle in Frederick, and are destined for downtown Washington (Connecticut Avenue/K Street), Bethesda, Rockville Town Center, the Life Sciences Center, and Germantown. For trips to downtown Washington, the transit travel time with the No-Build, TSM/TDM, LRT and BRT Alternates are comparable and just slightly over the travel time for LOV. Premium Bus provides the fastest travel times at just over 100 minutes, which is just under LOV travel time.

For travel to Bethesda, again the No-Build, TSM/TDM, LRT and BRT Alternates are all comparable with transit travel times at about 92 minutes. Premium Bus is fastest at just under 90 minutes. However, all alternates provide slower travel time than LOV, which is at least 10 minutes faster than the fastest alternate.

For travel to Rockville, transit travel times for the No-Build, TSM/TDM, LRT and BRT Alternates are all the same at approximately 75 minutes, while Premium Bus is slightly faster at about 72 minutes. Again, LOV provides faster travel than all the alternates by about 10 minutes.

For travel to Life Sciences Center, overall transit travel times are approximately 50 minutes slower than LOV. Transit travel times for the No-Build, TSM/TDM, LRT, BRT and Premium Bus Alternates are all within 10 minutes of each other, between 91 to 101 minutes.

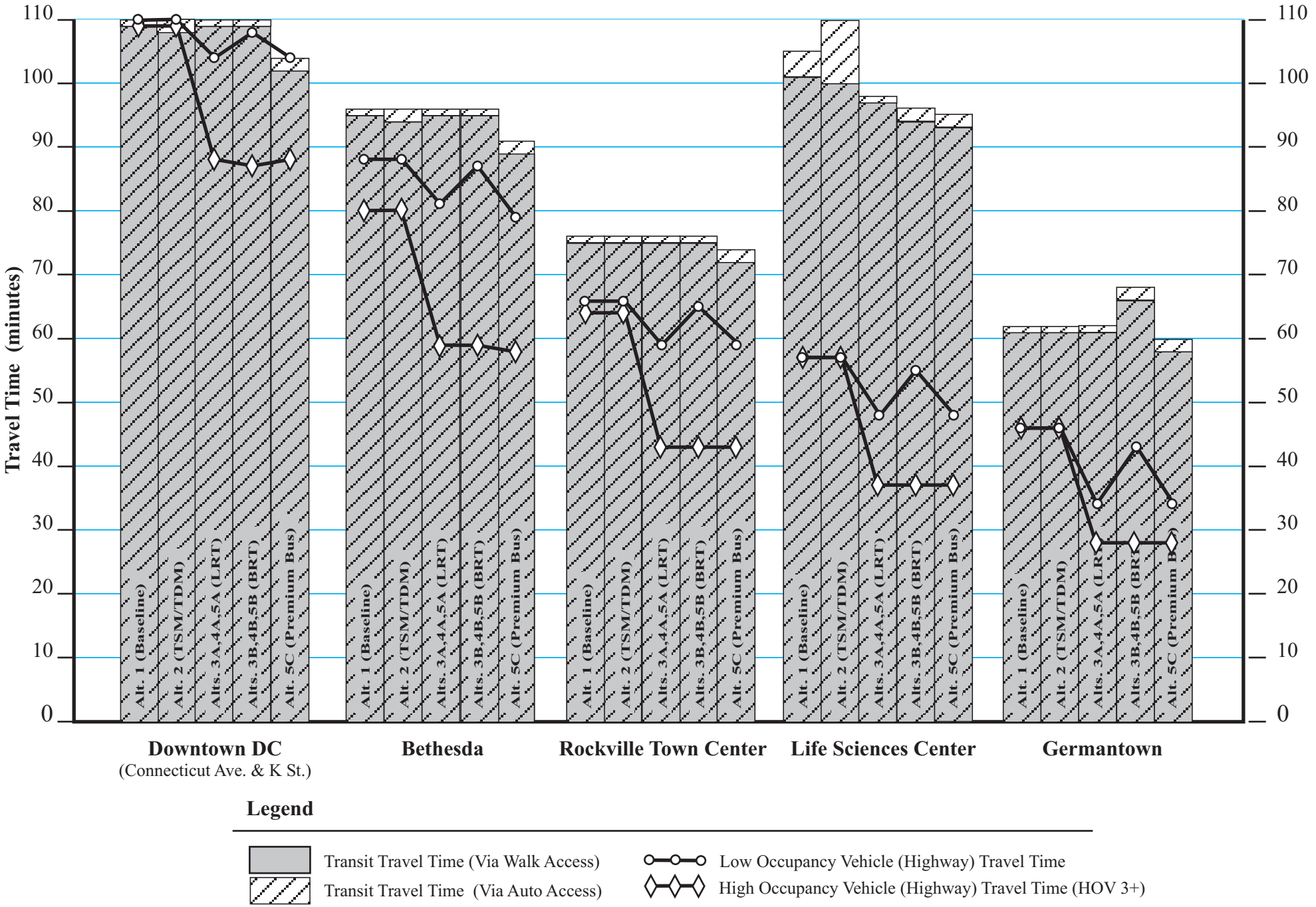
For travel to Germantown, Premium Bus is the fastest alternate, just slightly faster than the No-Build, TSM/TDM, and LRT Alternates. BRT provides the slowest travel time. LOV provides at least a 20-minute time savings over the transit alternates.

Overall, for travel from Frederick, Premium Bus provides the fastest transit travel times.

3. Transit Ridership

Table IV-4 and Figure IV-5 show the forecasted transit ridership for the 2025 AM peak period (5:30 AM to 9:30 AM) for each transit alternate. Estimates are provided for MARC boardings within the project area, Metrorail boardings, feeder and local bus boardings within the project area, and LRT, BRT or Premium Bus service depending on the alternate. **Table IV-5** presents a summary of the projected 2025 daily transit ridership. The MARC boardings were estimated by multiplying the projected AM peak period ridership by a factor of 2.1 while the remaining modes were estimated using a factor of 2.6. These daily peak factors are based on research performed

FIGURE IV-4
YEAR 2025 PROJECTED TRAVEL TIME BY ALTERNATE
TRAVELING FROM THE CITY OF FREDERICK



by the project team for two existing transit services that are comparable to the proposed services within the I-270 corridor. The following transit systems were investigated:

Port Authority Transit Corporation (PATCO) - Lindenwold Line

Based on information from the Port Authority Transit Corporation (PATCO) for operational data on its 14.2 mile rail line, which operates between Lindenwold, New Jersey and Center City Philadelphia, Pennsylvania, the following information was obtained:

Service Characteristics:

- Thirteen stations are located along the rail line
- The average speed during the peak period is 35 mph
- 6-car trains
- Car loading capacity:
  Seated = 80 persons/car
  Standing = 120% x 80 = 96 persons/car
  Average = 88 persons/car
- AM peak period headway = 4 minutes
- Daily ridership = 38,800

(1 train/4 min)x(120 min/peak period)x(88 persons/car)x(6 cars/train) = 15,840 trips/peak period

AM Peak to Daily Conversion Factor = 38,800/15,840 = 2.45

Washington Metropolitan Area Transit Authority (WMATA)

The following data was provided by WMATA's Business Planning and Development Section:

- Shady Grove Station
  - Peak Period: 5:30 AM to 9:30 AM
  - AM Peak Ridership: 6,496
  - Daily Ridership: 19,400
  - Peak to Daily Factor: 2.99
- Rockville Station
  - Peak Period: 5:30 AM to 9:30 AM
  - AM Peak Ridership: 2,242
  - Daily Ridership: 7,400
  - Peak to Daily Factor: 3.30
- Systemwide
  - AM Peak Ridership: 225,000
  - Daily Ridership: 688,000
  - Peak to Daily Factor: 3.06

The peak-to-daily conversion factor of 2.6 reflects an approximate estimate of these systems. The higher peak-to-daily ratio in the Washington region is likely due to the commuter oriented nature of the region's travel market and changing travel patterns. Additionally, the higher factor at the WMATA Rockville Station is probably related to the presence of the MARC – Brunswick Line station, which serves as a major transfer point.

Approximately 14,000 passengers are projected to use the Premium Bus and LRT Alternates during the AM peak period and approximately 18,000 passengers are projected to use the BRT Alternate. MARC ridership from the project area is projected to grow from approximately 2,000 riders during the AM peak period in 2001 to over 11,000 riders for the 2025 No-Build. 2025 MARC ridership from the project area is projected to drop to approximately 6,000 boardings for the LRT and Premium Bus Alternates and approximately 5,000 for the BRT Alternate. Passengers boarding Metrorail at the Shady Grove Metro and Rockville Metro Stations during the AM peak period are projected to be highest for the Premium Bus Alternate (24,800), which is 9,000 more than projected for the No-Build and over 14,000 more than board today. AM peak period Shady Grove Metro Station and Rockville Metro Station ridership is projected to be 19,200 for the LRT and 22,000 for the BRT Alternates. Feeder and local bus ridership is projected to be highest for the BRT and Premium Bus Alternates, 29,200 and 31,300 respectively, and it is nearly 10,000 lower for the LRT Alternate.

TABLE IV-4
2025 AM PEAK PERIOD TRANSIT RIDERSHIP SUMMARY (BOARDINGS)

	LRT, BRT or Premium Bus Boardings	Project area MARC Boardings	Shady Grove and Rockville Metrorail Boardings	Project area Feeder and Local Bus Boardings	Total Project area Transit Boarding
Year 2000 Observed	N/A	2,100	10,400	N/A	N/A
Alternate 1 (No-Build)	N/A	11,400	15,800	17,300	44,500
Alternate 2 (TSM/TDM)	N/A	9,900	15,900	27,600	53,400
Alternates 3A, 4A, 5A (LRT)	14,000	5,800	19,200	20,500	59,500
Alternates 3B, 4B, 5B (BRT)	18,300	6,000	22,000	29,200	75,500
Alternate 5C (Premium Bus)	14,500	4,700	24,800	31,300	75,300

Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

TABLE IV-5
2025 DAILY TRANSIT RIDERSHIP SUMMARY (BOARDINGS)

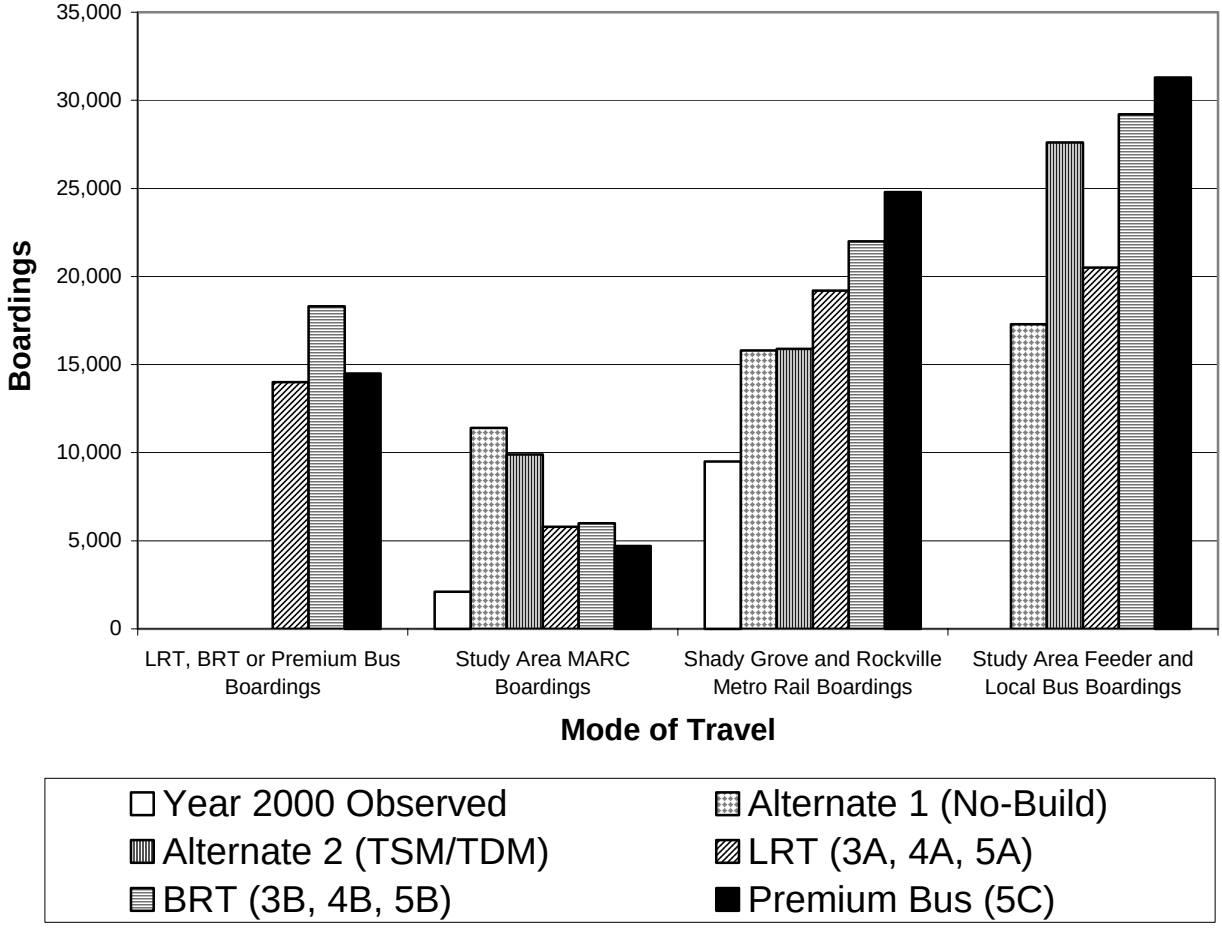
	LRT, BRT or Premium Bus Boardings	Project Area MARC Boardings	Shady Grove and Rockville Metrorail Boardings	Project Area Feeder and Local Bus Boardings	Total Project Area Transit Boarding
Year 2000 Observed	N/A	4,400	14,700	N/A	N/A
Alternate 1 (No-Build)	N/A	23,900	41,100	45,000	110,000
Alternate 2 (TSM/TDM)	N/A	20,800	41,300	71,800	133,900
Alternates 3A, 4A, 5A (LRT)	36,400	12,200	49,900	53,300	151,800
Alternates 3B, 4B, 5B (BRT)	47,600	12,600	57,200	75,900	193,300
Alternate 5C (Premium Bus)	37,700	9,900	64,500	81,400	193,500

Note: *Daily factor of 2.1 used to convert AM peak period MARC boardings to daily boardings. All other boardings were factored using 2.6.*

Source: *Daily to peak factor for Ride On, MTA and WMATA statistics.*

Analysis of this ridership data indicates that over 5,000 of the patrons forecasted to use the new transit service provided by the alternates are individuals who would have used the MARC service if the new service was not available. Most of these patrons will transfer to Metrorail at the Shady Grove Metro Station. It is also important to note that even the lowest projected MARC use is more than twice that of today and the No-Build Alternate is more than five times the current AM peak period MARC ridership (11,400 compared to 2,100).

FIGURE IV-5
2025 AM PEAK PERIOD TRANSIT BOARDINGS



4. Work Trip Market

Table IV-6 summarizes transit trip production (work trips to and from homes in the project area). **Table IV-7** summarizes the forecasted 2025 use of transit for trips to and from work. In these tables 2025 projected transit trips for the different alternates are compared to the projected transit use for the TSM/TDM Alternate. A change from the TSM/TDM Alternate as compared to the other alternates is calculated to show which alternate causes the greatest increase in transit trips to or from the project area. The TSM/TDM Alternate represents the practical extent by

which transit service can be improved in the project area without major infrastructure investments.

TABLE IV-6
2025 DAILY TRANSIT TRIPS TO AND FROM HOMES IN PROJECT AREA

Suburban Area	Alternate 1 (No-Build)	Alternate 2 (TSM/TDM)	Alternates 3A, 4A, 5A (LRT)	Alternates 3B, 4B, 5B (BRT)	Alternates 5C (Premium Bus)
Bethesda	7,900	7,900	7,900	8,000	7,900
North Bethesda	9,700	9,800	10,000	10,200	10,000
Rockville	16,300	17,100	17,900	18,200	17,700
Gaithersburg	19,400	21,600	25,000	25,800	24,500
Germantown	10,500	11,300	10,900	13,600	13,000
Clarksburg	2,000	2,700	2,500	3,400	3,800
Frederick City	3,200	3,500	2,700	3,600	5,300
Remainder of Frederick County	4,200	4,600	3,300	4,600	5,900
Total Project area	**73,200**	**78,500**	**80,200**	**87,400**	**88,100**
Change from TSM/TDM Alternate	**-5,300**	**0**	**1,700**	**8,900**	**9,600**
% Change from TSM/TDM Alternate	**-7%**	**0%**	**2%**	**11%**	**12%**

Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

Table IV-6 summarizes transit trip production (work trips to and from homes in the project Area). The TSM/TDM Alternate increases the number of transit trips over the No-Build by 7%. The LRT Alternate increases total usage by 2% over the TSM/TDM Alternate, while BRT and Premium Bus Alternates increase total usage by 11% and 12% respectively over TSM/TDM, and 18% and 19% respectively over the No-Build. Overall, the Premium Bus Alternate showed the highest increase in transit trips that were to and from homes located in the project area, followed closely by the BRT Alternate. The LRT Alternate barely generated an increase in transit trips compared to the TSM/TDM Alternate. There was five times as much of an increase in transit trips for BRT and Premium Bus Alternates as there was for the LRT Alternate. Specifically, Premium Bus serves Frederick County better than any of the other alternates. Germantown, Clarksburg and Frederick County are the least well served by the LRT Alternate. The Premium Bus Alternate has the greatest impact on transit ridership. The primary reason for this may be that the Premium Bus Alternate includes through routing of bus services, providing a one-seat trip for a larger number of new riders than the LRT.

TABLE IV-7
2025 DAILY TRANSIT TRIPS TO AND FROM WORK IN PROJECT AREA

Suburban Area	Alternate 1 (No-Build)	Alternate 2 (TSM/TDM)	Alternates 3A, 4A, 5A (LRT)	Alternates 3B, 4B, 5B (BRT)	Alternate 5C (Premium Bus)
Bethesda	20,300	20,400	20,100	20,600	21,200
North Bethesda	12,300	12,600	12,200	13,000	13,300
Rockville	24,300	26,300	27,600	29,700	29,900
Gaithersburg	10,900	13,500	17,000	17,100	15,400
Germantown	1,600	2,000	2,600	2,800	2,000
Clarksburg	80	200	200	200	30
Frederick City	2,700	3,000	2,800	2,900	3,000
Remainder Frederick County	100	100	100	700	300
Total project area	**72,200**	**78,100**	**82,600**	**87,000**	**85,130**
Change from TSM/TDM Alternate	**-5,820**	**0**	**4,500**	**8,900**	**7,030**
% Change from TSM/TDM Alternate	**-7%**	**0%**	**6%**	**11%**	**9%**

Source: *MWCOG Travel Forecast 4/2001 – 7/2001*

Trip attractions are summarized in **Table IV-7**, for trips to and from work locations within the project area follow the same type of pattern as the trips to home locations. The TSM/TDM Alternate is forecasted to generate a 7% increase in transit riders compared to the No-Build Alternate. The LRT Alternate still resulted in the lowest increase in usage of all the alternates, but the increase in transit use at the work end is projected to be higher than at the home end (4,500 more trips than the TSM/TDM Alternate at the work end compared to 1,700 at the home end). In other words, the LRT serves employment in the project area better than it does residents. The BRT Alternate generates the greatest increase in transit trips over the TSM/TDM Alternate at the work end (8,900) followed by the Premium Bus Alternate (7,030). Clarksburg is least well served by the Premium Bus Alternate, while the City of Frederick is best served by the Premium Bus Alternate. The remainder of Frederick County is best served by the BRT Alternate. The BRT and LRT Alternates generate approximately the same number of transit users destined to jobs in Bethesda, North Bethesda, Rockville, Gaithersburg, Germantown and Clarksburg. The Premium Bus Alternate generates fewer transit trips than the other two alternates for trips to Clarksburg, Gaithersburg and Germantown.

5. New Transit Riders

A measure of the effectiveness of the different alternates is the number of new riders who would not otherwise use transit without that alternate being available. These riders reflect the number of people diverted from auto usage because the transit alternates provide an attractive choice in terms of travel time, convenience, and cost.

Table IV-8 provides an estimate of the number of people who are projected to use transit who would not use transit with the No-Build Alternate. As can be seen from this table, over 7,000 new riders are projected if the TSM/TDM Alternate is implemented. The LRT Alternates are

projected to result in 2,800 more transit riders than the TSM/TDM Alternate. The BRT Alternates result in the most new riders (11,400) over the TSM/TDM Alternate, followed by the Premium Bus Alternate, which is projected to generate 10,800 new transit users more than the TSM/TDM Alternate. Considerably more new transit riders are generated by the BRT and Premium Bus alternates than LRT.

TABLE IV-8
NEW DAILY TRANSIT RIDERS IN CORRIDOR

Alternate	Total Riders	New Riders Compared with No-Build		New Riders Compared with TSM/TDM Alternate	
Alternate 1 (No-Build)	78,500	0	0.0%	-7,000	-8.2%
Alternate 2 (TSM/TDM)	85,500	7,000	8.9%	0	0.0%
Alternates 3A, 4A, 5A (LRT)	88,300	9,800	12.5%	2,800	3.3%
Alternates 3B, 4B, 5B (BRT)	96,900	18,400	23.4%	11,400	13.3%
Alternate 5C (Premium Bus)	96,300	17,800	22.7%	10,800	12.6%

Note: *New transit riders are defined as new daily transit trips to or from the project area.*
Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

6. Access and Egress Modes

The forecasted access modes of passengers boarding at the proposed stations were analyzed as a transportation impact. The highest peak period boardings are typically at those stations that provide large park and ride lots and feeder bus service. Transit patrons will generally walk to a rail station when the distance does not exceed one-half mile. Beyond a half mile, access is provided either by feeder bus service, automobile to a park and ride lot where the vehicle is parked and the driver and passengers then ride transit, or by automobile to a kiss and ride facility where the transit passenger is dropped off and picked up after their return trip by a motorist.

Table IV-9 provides the AM peak period boardings for the LRT Alternate. Approximately half of the total passengers are arriving at the stations by auto access. Bus access and walk access make up the other half. The Decoverly and School Drive stations result in the highest overall passenger boardings (3,500) and, therefore, result in the highest number of walk access boardings (1,000) and bus access boardings (800). Three-fourths of the passengers boarding at the East Gaither (King Farm) to Washingtonian stations walk to those stations, however these stations have the lowest number of users, only 800 passengers use those stations during the AM peak period. The most northern stations, which include the Dorsey Mill to COMSAT stations, have the highest number of patrons who use auto to access transit and the most southern stations, which include the East Gaither (King Farm) to Washingtonian stations, have the lowest number.

TABLE IV-9
AM PEAK PERIOD LRT BOARDINGS - HOME TO WORK TRIPS

Station Grouping	Total Boardings	Walk Access	Bus Access[1]	Auto Access[2]
Shady Grove Metro Station[3]	2,000	N/A	N/A	N/A
East Gaither (King Farm) to Washingtonian	800	600	100	100
Decoverly to School Drive	3,500	1,000	800	1,700
Quince Orchard Park to Metropolitan Grove	2,500	700	200	1,600
Germantown Center to Cloverleaf	2,500	700	700	1,100
Dorsey Mill to COMSAT	2,700	400	100	2,300
Total	**14,000**	**3,400**	**3,800**	**6,800**

Notes: *1. The approximate difference between the actual sum of all bus access boardings (1,900) and the total of the bus access column (3,800) is the amount of total boardings at Shady Grove.*
2. Auto access includes park and ride and kiss-and-ride.
3. Cannot determine access mode since station is shared with Metrorail.

Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

Table IV-10 provides the AM peak period boardings for the BRT Alternate. For this alternate, access to stations is almost evenly divided among the three access modes. Again, the northern stations, which include the Dorsey Mill to COMSAT stations, have the highest number of patrons who use auto to access transit (1,600); the southern stations, which include the East Gaither (King Farm) to Washingtonian stations, and the Germantown Center to Cloverleaf stations have the lowest (200 each).

TABLE IV-10
AM PEAK PERIOD BRT BOARDINGS - HOME TO WORK TRIPS

Station Grouping	Total Boardings	Walk Access	Bus Access	Auto Access[1]
Shady Grove Metro Station[2]	5,700	N/A	N/A	N/A
East Gaither (King Farm) to Washingtonian	2,300	600	1,500	200
Decoverly to School Drive	2,600	1,200	200	1,300
Quince Orchard Park to Metropolitan Grove	2,700	800	1,000	900
Germantown Center to Cloverleaf	2,200	1,000	1,000	200
Dorsey Mill to COMSAT	2,800	370	900	1,600
Total	**18,300**	**3,970**	**4,600**	**4,200**

Notes: *1. Auto access includes park and ride and kiss-and-ride.*
2. Cannot determine access mode since station is shared with Metrorail.

Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

Table IV-11 provides the AM peak period boardings for the Premium Bus Alternate. The stations for the Premium Bus Alternate vary slightly from LRT and BRT. Half of the passengers used autos to access the Premium Bus stations, approximately 30% used bus and approximately

20% walked. The lowest number of passengers arrived at the MD 75 and MD 85 stations at the northern end of the study corridor. Overall, the most passengers used Metropolitan Grove and Germantown Center stations at the southern end of the study corridor, both of which had higher bus and auto access than walk access.

TABLE IV-11
AM PEAK PERIOD PREMIUM BUS BOARDINGS - HOME TO WORK TRIPS

Station Grouping	Total Boardings	Walk Access	Bus Access	Auto Access[1]
Shady Grove Metro Station[2]	3,800	N/A	N/A	N/A
Metropolitan Grove	3,900	600	1,600	1,700
Germantown	4,000	1,000	1,500	1,500
COMSAT	2,500	300	300	1,900
MD 75	100	0	50	50
MD 85	200	N/A	20	200
Total	**14,500**	**1,900**	**3,470**	**5,350**

Notes: *1 Auto access includes park and ride and kiss-and-ride.*
2. Cannot determine access mode since station is shared with Metrorail.
Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

7. Projected Effects on Metrorail and MARC Ridership

Table IV-12 provides the daily boardings for the different stations along the corridor by alternate. Overall, boardings for commuter rail are highest for No-Build, followed by TSM/TDM, BRT, and LRT while Premium Bus has the lowest number of passengers who use MARC. Germantown to Gaithersburg has the highest MARC boardings for each alternate. Frederick to Monocacy is the only area where MARC boardings are higher for the LRT alternate than the BRT alternate. For Metrorail, the highest boardings occur with the Premium Bus alternate, followed by BRT, LRT, TSM/TDM and No-Build.

TABLE IV-12
PROJECTED DAILY RIDERSHIP AT MARC AND SELECTED METRORAIL STATIONS (BOARDINGS)

MARC/Metrorail Stations	Number of Stations	Total Boardings				
		Alternate 1 No-Build	Alternate 2 TSM/TDM	Alternates 3A/4A/5A LRT	Alternates 3B/4B/5B BRT	Alternate 5C Premium Bus
MARC Brunswick Line		23,900	20,800	12,200	12,600	9,900
Frederick to Monocacy	2	2,200	1,300	1,600	900	300
Brunswick to Boyds	5	8,100	7,600	3,700	4,200	4,000
Germantown to Gaithersburg	3	13,600	11,900	6,900	7,500	5,600
Metrorail						
Shady Grove to Rockville	2	41,100	41,300	49,900	57,200	64,500

Source: *MWCOG Travel Forecast 4/2001 – 7/2001*

8. Transit Conclusions

The general transit ridership trends show that project area MARC boardings will decrease under the build alternates when compared with the No-Build Alternate, while the Shady Grove and Rockville Metrorail boardings and the project area feeder and local bus boardings will increase (**Table IV-4**). This is due to the southern terminus of the proposed CCT located at the Shady Grove Metro Station, and the projections that approximately 60% of the transit trips in the corridor will transfer at Shady Grove. The transit forecasts continue to show the need for additional transit services in the corridor beyond what is currently in place.

Ridership projections for the proposed build alternates show that the BRT Alternates (Alternates 3B/4B/5B) generate the largest transit ridership, with approximately 18,300 riders in the 2025 AM peak period. The Premium Bus Alternate (Alternate 5C) would generate the second largest transit ridership with 14,500 riders during the 2025 AM peak period; the LRT Alternates (Alternates 3A/4A/5A) would generate the least amount of transit riders of the three alternates, with approximately 14,000 riders for the 2025 AM peak period.

The BRT Alternate will result in the most new corridor transit riders (see **Table IV-8**) due to its accessibility throughout the corridor and the ability of buses to travel off the transitway alignment and serve a larger market area. The Premium Bus Alternate would result in the second most new riders, and the LRT Alternate would result in the least amount of new transit riders. In addition, the BRT Alternate exhibits the largest savings of travel time, as it provides more than 30 minutes of potential travel time savings for approximately 89,200 daily work trips when compared to the No-Build Alternate. The Premium Bus Alternate exhibits the second most potential (53,400 daily work trips) and the LRT Alternate offers the least potential for travel time savings of more than 30 minutes (8,100 daily work trips).

E. ROADWAY NETWORK EFFECTS

1. Traffic Operations for Existing (1998) Conditions

Operations of highway facilities are evaluated using qualitative measures that characterize operational conditions within a traffic stream and their perception by motorists and passengers. Traffic operations are characterized by level of service (LOS). Each LOS is given letter designations, from A to F, with LOS A representing the best operating conditions or free flow conditions with few interactions between vehicles and LOS E representing capacity of the facility. LOS F represents the worst conditions when a facility is being used to its fullest capacity and severe congestion is experienced. LOS is determined using techniques that are continuously being refined by research performed for the Transportation Research Board (TRB). Periodically recommendations for LOS analysis are published by TRB. The freeway analyses performed for this study are based on the Highway Capacity Manual published by TRB in 1998.

Table I-6 in **Chapter I** illustrates 1998 existing conditions on the mainline of I-270 and US 15 in the project area. During the 1998 AM peak hour, southbound I-270 operated at LOS E except for the sections from MD 118 to MD 121, which operated at LOS C/D. Southbound US 15 operated at various levels of congestion in 1998. The I-70 to US 15/US 340 segment operated at LOS C, US 15/US 340 to MD 144 at LOS D, MD 144 to Opossumtown Pike/Motter Avenue at LOS E, Opossumtown Pike/Motter Avenue to MD 26 at LOS D, MD 26 to Trading Lane at LOS B, and Trading Lane to Biggs Ford Road at LOS C.

Northbound I-270 was congested during the 1998 PM peak hour, operating at LOS D/E. The I-370 to MD 124 mainline segments operated at LOS D, and the northbound C-D lanes operate at LOS C. The northern portion of I-270 from MD 124 to I-70 operated at LOS D/E. In 1998, northbound US 15 operated at LOS D/E from I-70 to MD 26, and LOS C from MD 26 to Biggs Ford Road.

2. Traffic Operations for 2025 No-Build and TSM/TDM Alternates

Operations on the mainline of I-270 and US 15 are projected to degrade significantly between 1998 and the 2025 No-Build Alternate. During the AM peak hour, southbound I-270 will experience a drop in LOS from E to F, and US 15 will experience a lesser degradation, generally to LOS E. The I-270 northbound direction during the PM peak hour is projected to experience a drop in LOS from D/E to F. US 15 will generally change from LOS D/E to LOS E/F.

Table IV-13 illustrates 2025 No-Build (Alternate 1) and TSM/TDM (Alternate 2) operating conditions on the mainline of I-270 and US 15 along the corridor. Congestion is expected during the AM peak hour with the southbound direction projected to operate at LOS F along I-270. The US 15 portion is projected to operate at LOS D from I-70 to Jefferson Street and LOS E/F from Jefferson Street to Biggs Ford Road.

Congestion is also projected for the I-270 northbound direction during the PM peak hour, operating at LOS F, with the exception of the segment just south of I-370, which would operate at LOS D. The northbound C-D lane between I-370 and MD 117 and between MD 117 and

MD 124 is projected to operate at LOS F/E, respectively. Northbound US 15 would operate at LOS E/F from I-70 to Biggs Ford Road.

Figures IV-6 and IV-7 indicate traffic volumes and LOS for the 1998 existing conditions and Alternates 1 and 2, respectively.

3. Build Alternates

Table IV-13 compares the AM and PM peak hour mainline and C-D lanes LOS between the projected 2025 traffic for Alternates 1 & 2, and Alternates 3A/B, 4A/B and 5A/B/C respectively.

a. Alternates 3A/B

With Alternates 3A/B, I-270 traffic operations are expected to improve slightly over the No-Build and TSM/TDM Alternates during the AM and PM peak hours in the northbound direction between Middlebrook Road and MD 121, and in the southbound direction between MD 118 and MD 121. Over the entire 31± mile corridor study area, the proposed improvements with Alternates 3A/B result in approximately seven fewer miles of LOS F operations northbound and approximately four fewer miles of LOS F operations southbound as compared to the 2025 No-Build conditions.

In the northbound direction with Alternates 3A/B conditions, the mainline is projected to operate at LOS F from south of the I-370 interchange to the proposed Watkins Mill Road interchange, LOS E from Watkins Mill Road to MD 121, LOS F from MD 121 to MD 85, and LOS D from MD 85 to I-70. The extended C-D lanes, which accommodate the merging traffic on and off of I-270 will operate at LOS F from south of the I-370 interchange to the Middlebrook Road interchange and LOS E/D from Middlebrook Road to Father Hurley Boulevard. US 15 northbound is projected to operate at LOS E/F from I-70 to Rosemont Avenue and LOS C/D from Rosemont Avenue to Biggs Ford Road.

In the southbound direction, the mainline is projected to operate at LOS F from south of the I-370 interchange to MD 118, LOS E from MD 118 to MD 121, and LOS F from MD 121 to I-70. The southbound I-270 C-D lanes will operate at LOS E/F from I-370 to MD 118 and LOS D from MD 118 to Father Hurley Boulevard. US 15 southbound is projected to operate at LOS C/D, with the exception of the segment between Jefferson Street and MD 144, which will operate at LOS F.

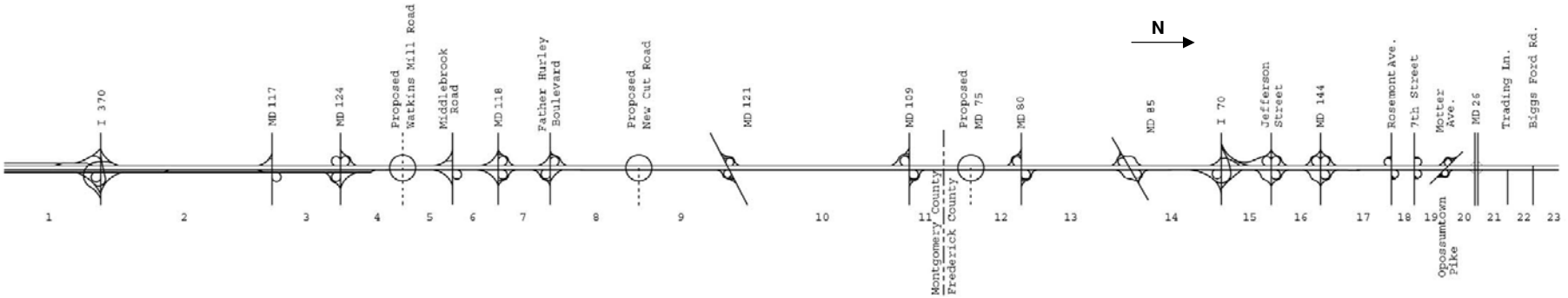
Figure IV-8 indicates traffic volumes, number of lanes, LOS, and volume to capacity ratios for Alternates 3A/B.

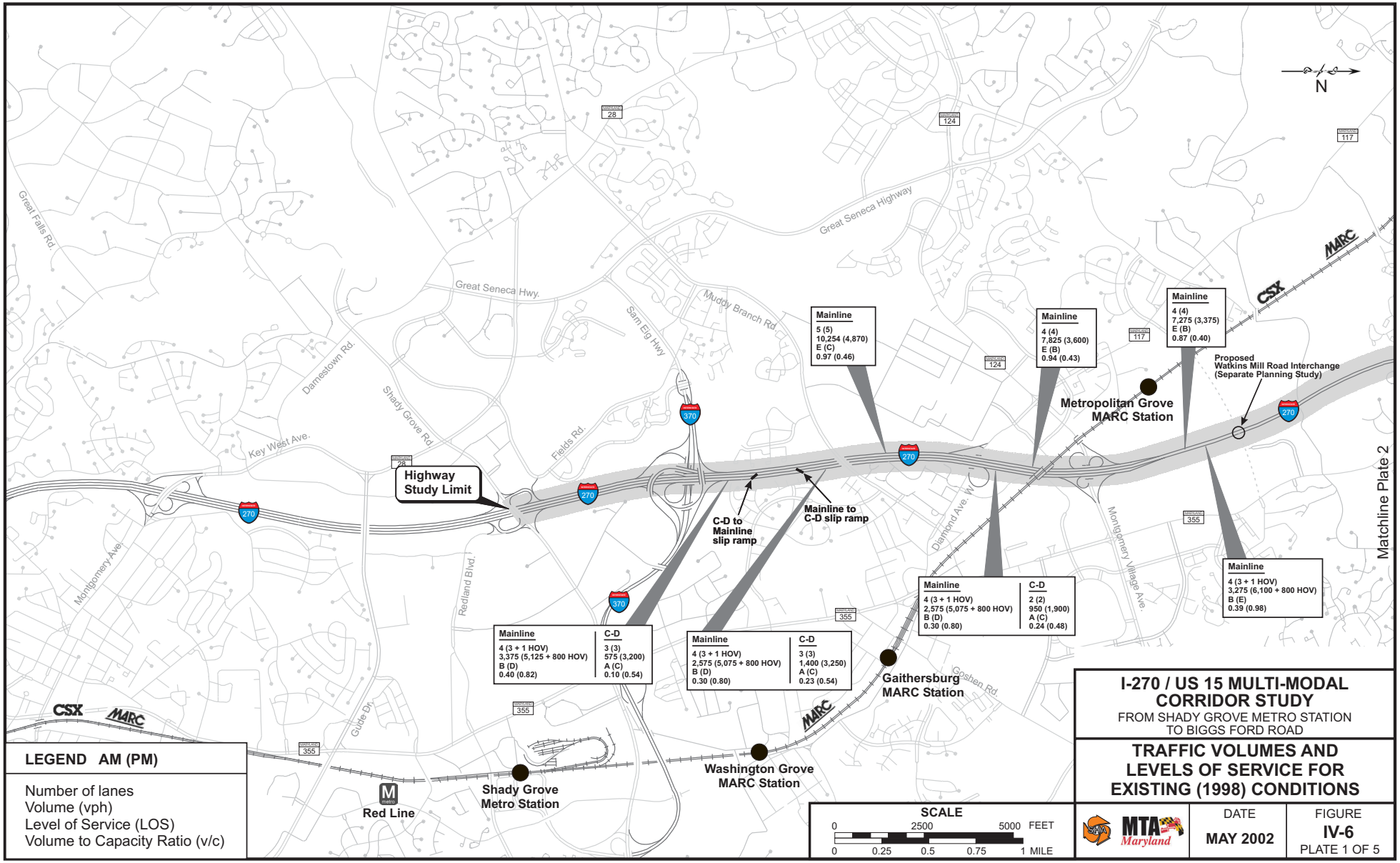
TABLE IV-13
2025 NO-BUILD AND BUILD ALTERNATES AM(PM) PEAK HOUR MAINLINE LEVEL OF SERVICE (LOS) [1,2] / VOLUME TO CAPACITY (V/C) RATIOS [3] ALONG I-270 AND US 15

	Highway Segments	Alternates 1 & 2 (2025)				Alternates 3A/B (2025)				Alternates 4A/B (2025)				Alternates 5A/B/C (2025)			
		Northbound		Southbound		Northbound		Southbound		Northbound		Southbound		Northbound		Southbound	
		Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes	Mainline	C-D Lanes
1.	South of I-370	C (D)	C (F)/-(1.91)	F (C) /1.22(-)	F (C)/1.10(-)	B(F)/-(1.14)	E(F)/-(1.38)	F(B)/1.35(-)	F(D)/1.02(-)	B(F)/-(1.14)	E(F)/-(1.38)	F(B)/1.35(-)	F(D)/1.02(-)	B(F)/-(1.15)	E(F)/-(1.40)	F(B)/1.37(-)	F(D)/1.03(-)
2.	I-370 to MD 117	C (F) /-(1.03)	A(E)	F (D) /1.37(-)	-	B(F)/-(1.15)	D(F)/-(1.20)	F(B)/1.34(-)	F(D)/1.08(-)	B(F)/-(1.15)	D(F)/-(1.20)	F(B)/1.35(-)	F(D)/1.08(-)	B(F)/-(1.15)	D(F)/-(1.23)	F(B)/1.37(-)	F(D)/1.10(-)
3.	MD 117 to MD 124	C (F) /-(1.09)	B (E)	F (D) /1.41(-)	-	B(F)/-(1.15)	D(F)/-(1.14)	F(B)/1.14(-)	E(D)	B(F)/-(1.15)	D(F)/-(1.14)	F(B)/1.14(-)	E(D)	B(F)/-(1.15)	D(F)/-(1.18)	F(B)/1.16(-)	E(D)
4.	MD 124 to Proposed Watkins Mill Road	D (F) /-(1.83)	-	F (D) /1.49(-)	-	B(F)/-(1.15)	E(F)/-(1.17)	F(B)/1.14(-)	E(D)	B(F)/-(1.15)	E(F)/-(1.17)	F(B)/1.14(-)	E(D)	B(F)/-(1.15)	E(F)/-(1.20)	F(B)/1.16(-)	E(D)
5.	Proposed Watkins Mill Road to Middlebrook Road		-		-	A(E)	E(F)/-(1.14)	F(B)/1.28(-)	F(D)/1.12(-)	A(E)	E(F)/-(1.14)	F(B)/1.28(-)	F(D)/1.12(-)	A(E)	E(F)/-(1.17)	F(B)/1.32(-)	F(D)/1.14(-)
6.	Middlebrook Road to MD 118	C (F) /-(1.39)	-	F (D) /1.51(-)	-	B(E)	C(E)	F(B)/1.28(-)	D(C)	B(E)	C(E)	F(B)/1.28(-)	D(C)	B(E)	C(E)	F(B)/1.32(-)	D(C)
7.	MD 118 to Father Hurley Boulevard	C (F)[4]	-	E(C)	-	B(E)	A(D)[4]	E(B)	D(C)	B(E)	A(D)[4]	E(B)	D(C)	B(E)	A(D)[4]	F(B)/1.01(-)	D(C)
8.	Father Hurley Boulevard to Proposed Newcut Road	D (F) /-(1.94)	-	F (E) /1.21(-)	-	B(E)	C(E)	E(B)	F(E)/1.12(-)	B(E)	C(E)	E(B)	F(E)/1.12(-)	B(E)	C(E)	E(B)	F(E)/1.10(-)
		Mainline		Mainline		Mainline		Mainline		Mainline		Mainline		Mainline		Mainline	
9.	Proposed Newcut Road to MD 121	D (F) /-(1.94)		F (E) /1.21(-)		B(E)		E(C)		B(E)		E(C)		B(E)		E(C)	
10.	MD 121 to MD 109	D (F) /-(1.45)		F (E) /1.15(-)		C(F) / -(1.54)		F(D) / 1.27(-)		C(F) / -(1.12)		E(D)		C(F) / -(1.16)		E(C)	
11.	MD 109 to Proposed MD 75	D (F) /-(1.25)		F (E) /1.16(-)		C(F) / -(1.34)		F(D) / 1.29(-)		C(E)		E(D)		C(F) / -(1.03)		E(C)	
12.	Proposed MD 75 to MD 80					C(F) / -(1.40)		F(C) / 1.23(-)		C(E)		E(D)		B(F) / -(1.01)		E(C)	
13.	MD 80 to MD 85	E (F) /-(1.41)		F (F) /1.37(1.00)		C(F) / -(1.48)		F(D) / 1.48(-)		D(F) / -(1.11)		F(D) / 1.12(-)		C(F) / -(1.16)		F(C) / 1.15(-)	
14.	MD 85 to I-70	C (F) /-(1.05)		F (F) /1.48(1.01)		B(D)		F(D) / 1.50(-)		B(C)		F(D) / 1.11(-)		B(D)		F(C) / 1.14(-)	
15.	I-70 to Jefferson Street	C (E)[4]		D (C)		C(F)[4]		D(C)		C(F)[4]		D(C)		C(F)[4]		D(C)	
16.	Jefferson Street to US 40/MD 144	D (F)[4]		E (D)[4]		C(E)[4]		F(E)[4]		C(E)[4]		F(E)[4]		C(F)[4]		F(E)[4]	
17.	US 40/MD 144 to Rosemont Avenue	E (F) /-(1.21)		F (F) /1.04(1.03)		D(E)		D(D)		D(E)		D(D)		D(E)		D(D)	
18.	Rosemont Avenue to 7th Street	E (E)		E (E)		C(C)[4]		D(D)		C(C)[4]		D(D)		C(C)[4]		D(D)	
19.	7th Street to Opossumtown Pike	D (E)		E (E)		C(D)		D(C)[4]		C(D)		D(C)[4]		C(D)		D(C)[4]	
20.	Opossumtown Pike to MD 26	C (E)		E (D)		B(C)		C(B)		B(C)		C(B)		B(C)		C(B)	
21.	MD 26 to Trading Lane	D (F) /-(1.10)		F (C) /1.00(-)		B(D)		C(B)		B(D)		C(B)		B(D)		C(B)	
22.	Trading Lane to Biggs Ford Road	C (E)		E (C)		B(D)		D(B)		B(D)		D(B)		B(D)		D(B)	
23.	North of Biggs Ford Road	-		-		A(C)		C(A)		A(C)		C(A)		A(C)		C(A)	

Source: *RK&K, BMI, 2001*

1. *LOS A – free flowing traffic; LOS B and C – stable flowing traffic; LOS D – slight impact to traffic flow; LOS E – traffic volumes approaching capacity of facility; LOS F – stop and go, standstill conditions.*
2. *Levels of service were calculated based on traffic counts collected in 1998 and 2025 traffic projections for the No-Build and Build alternates.*
3. *Volume to capacity (v/c) ratios reported for mainline (freeway) level of service F conditions only.*
4. *Indicates weaving section along I-270 or US 15*





I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

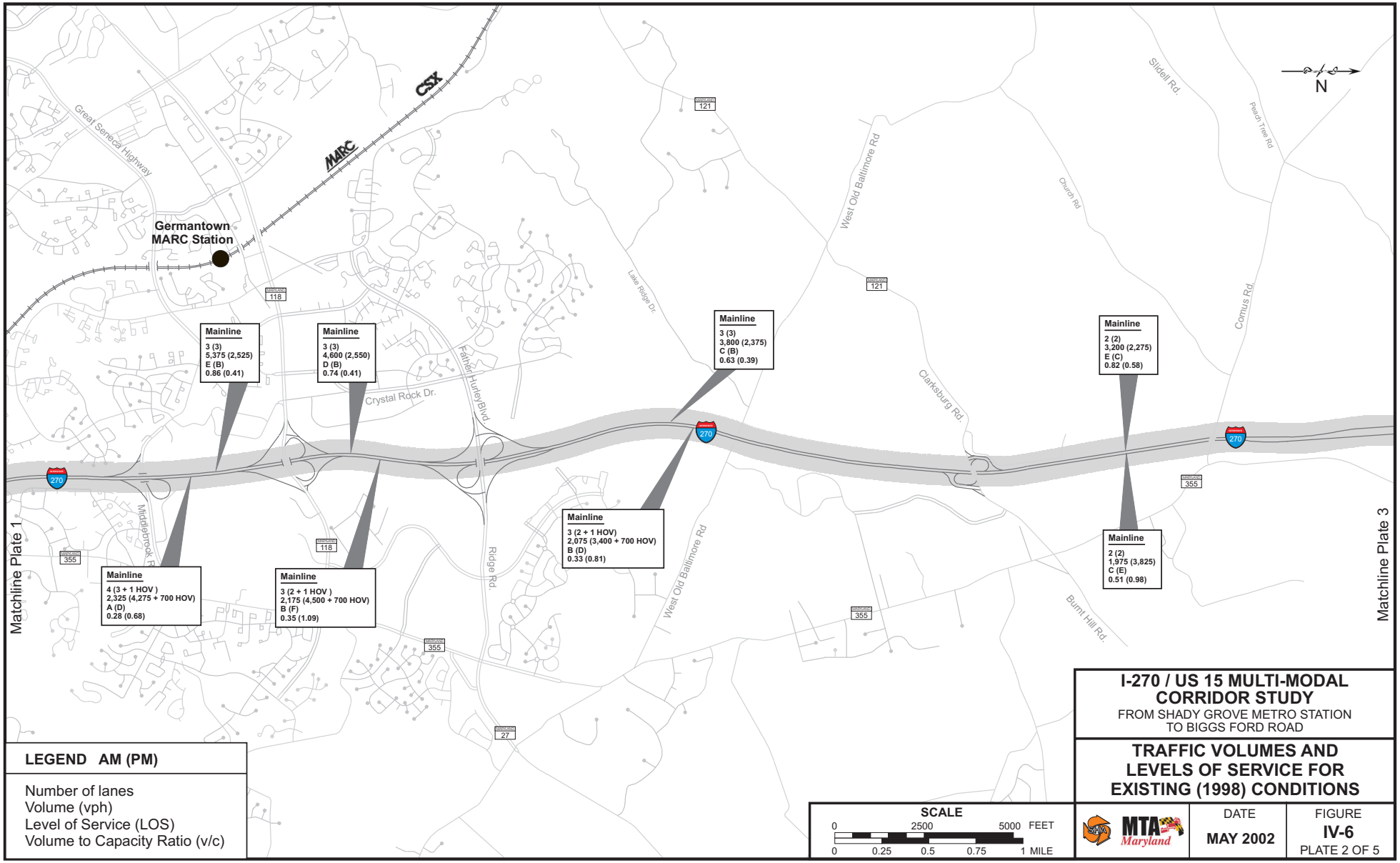
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR EXISTING (1998) CONDITIONS

MTA Maryland

DATE
MAY 2002

FIGURE
IV-6
PLATE 1 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

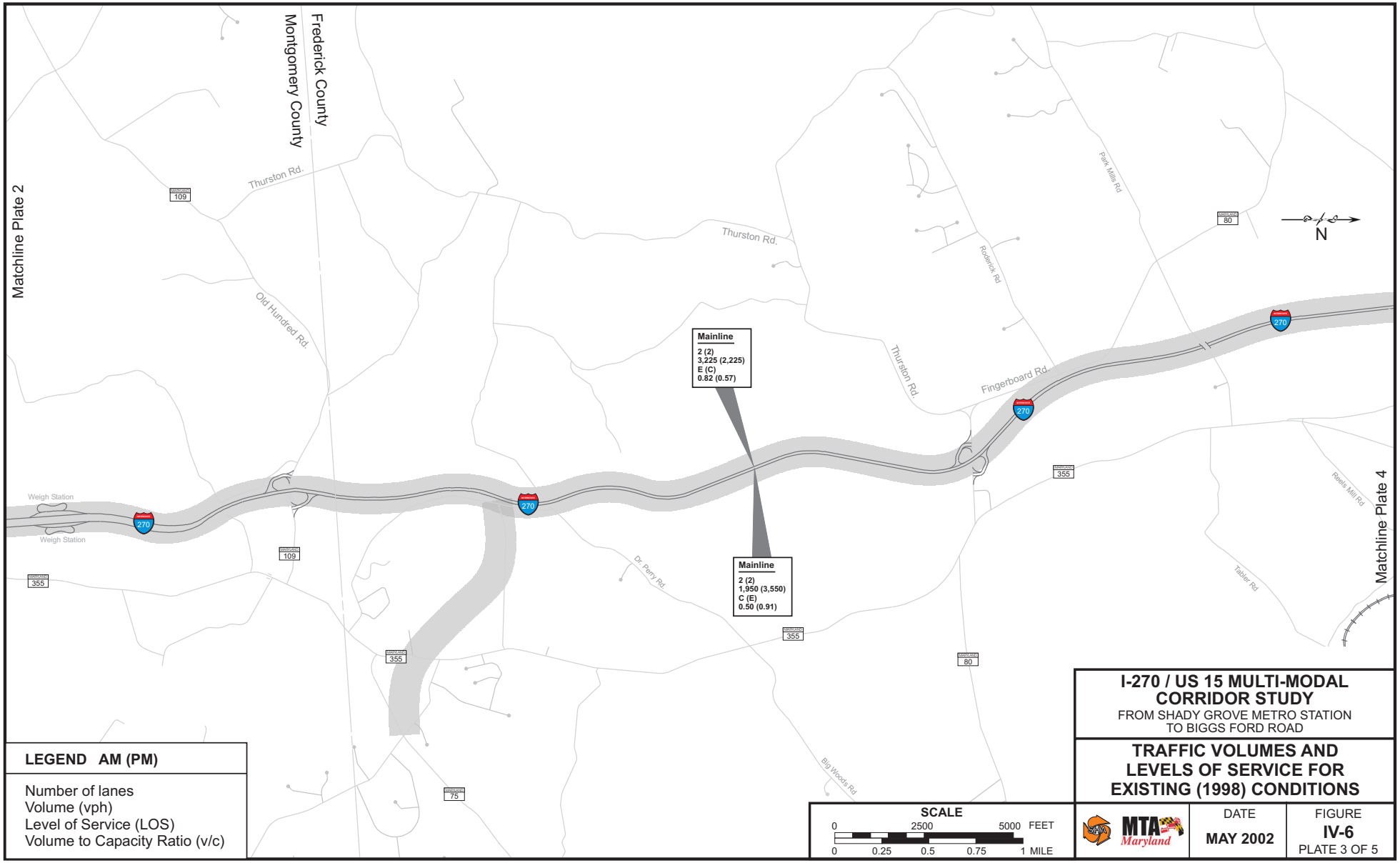
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR EXISTING (1998) CONDITIONS

MTA Maryland

DATE
MAY 2002

FIGURE
IV-6
PLATE 2 OF 5



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE

0 2500 5000 FEET

0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

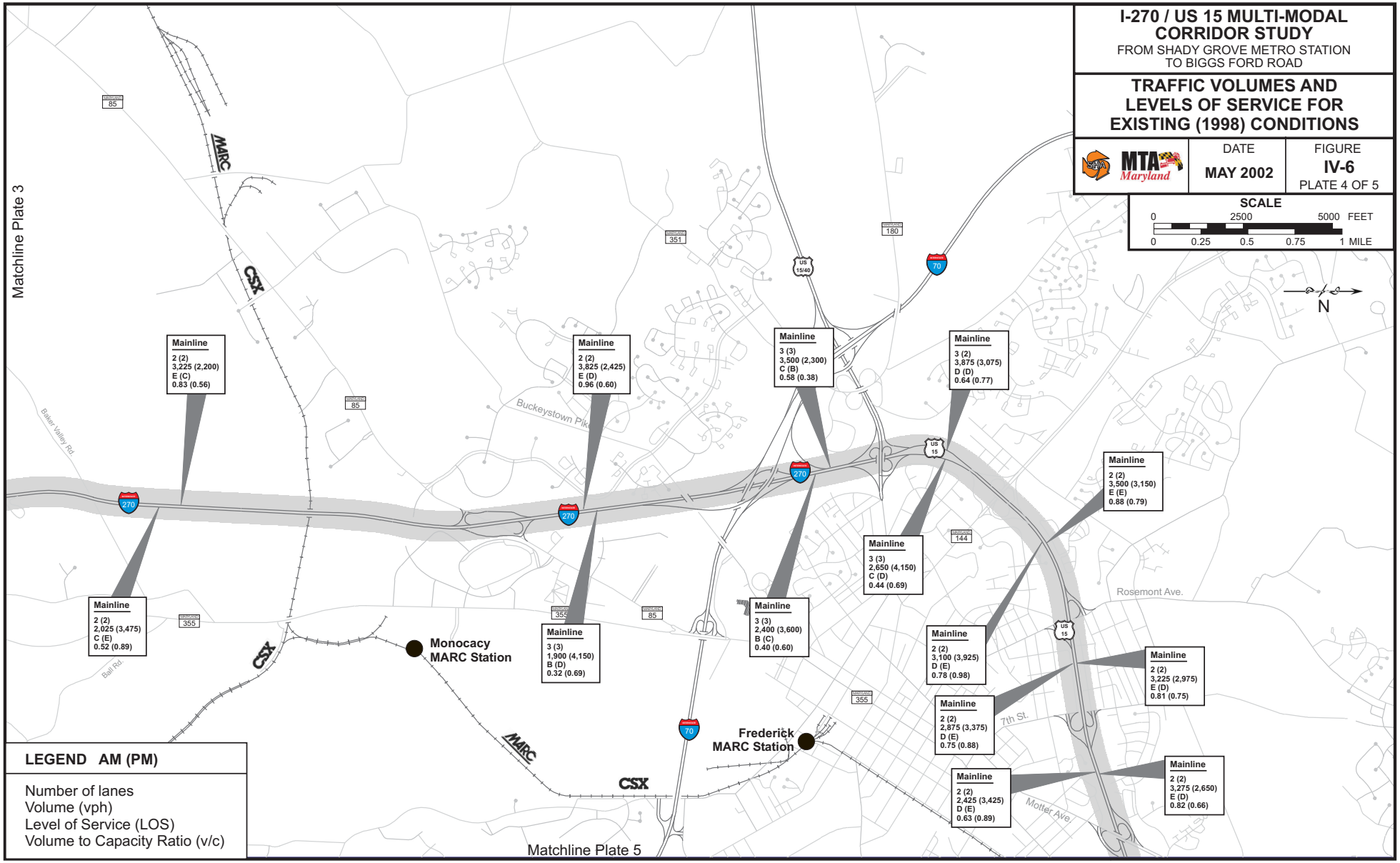
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

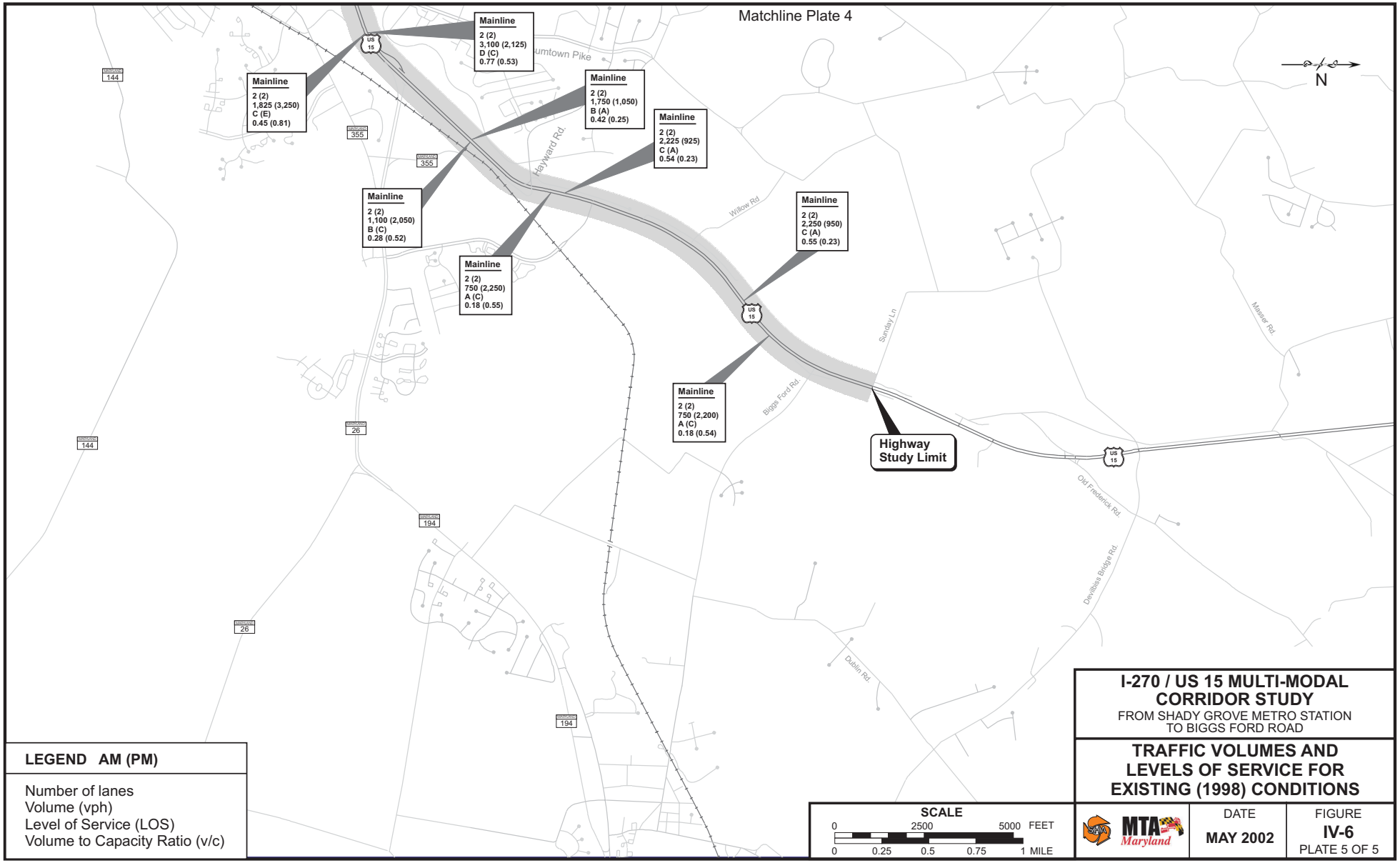
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR EXISTING (1998) CONDITIONS

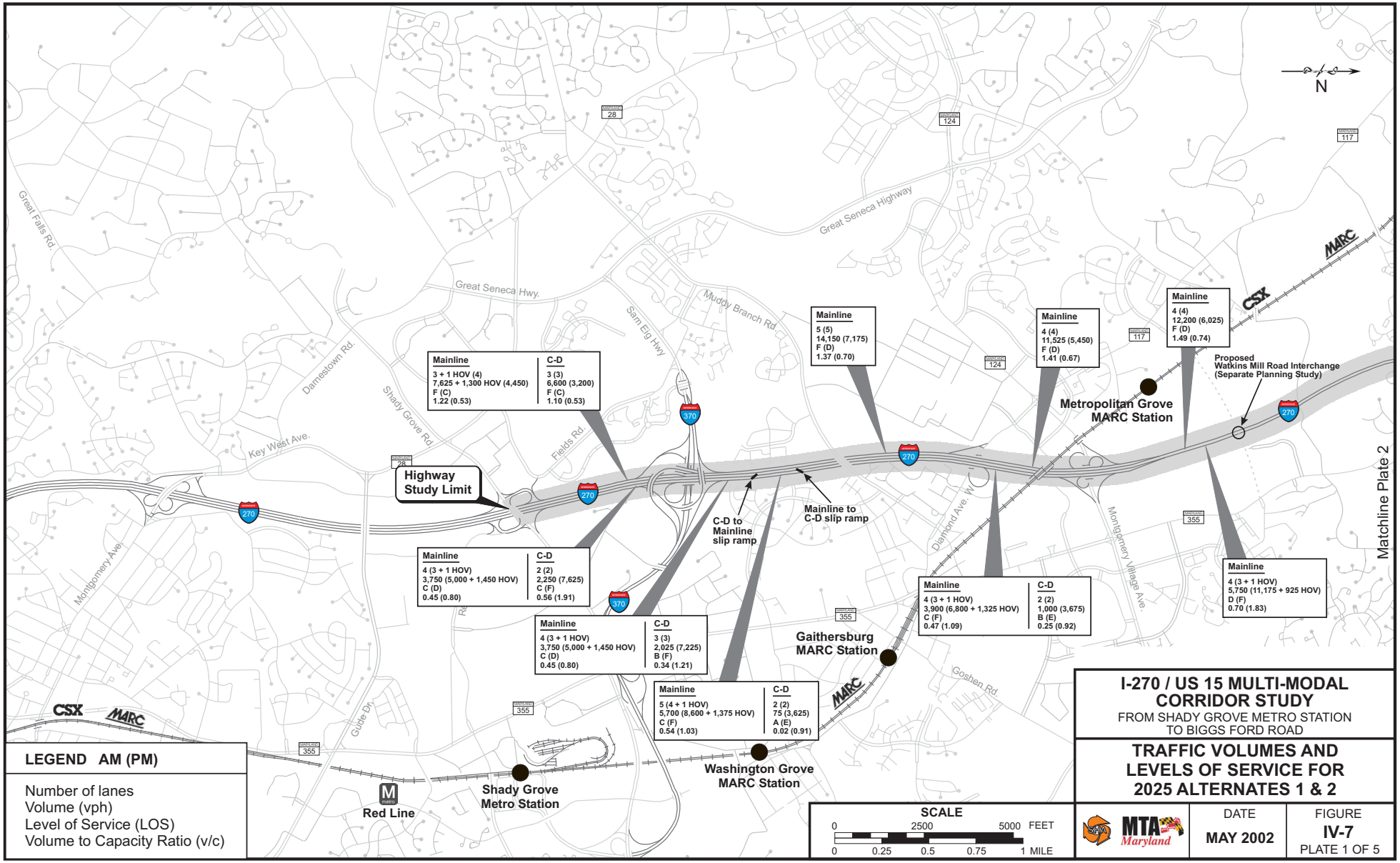
MTA Maryland

DATE
MAY 2002

FIGURE
IV-6
PLATE 3 OF 5


I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR EXISTING (1998) CONDITIONS
MTA Maryland
DATE
MAY 2002
FIGURE
IV-6
PLATE 4 OF 5
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
N
Matchline Plate 3
Matchline Plate 5
Mainline
2 (2)
2,025 (3,475)
C (E)
0.52 (0.89)
Mainline
2 (2)
3,225 (2,200)
E (C)
0.83 (0.56)
Mainline
3 (3)
1,900 (4,150)
B (D)
0.32 (0.69)
Mainline
2 (2)
3,825 (2,425)
E (D)
0.96 (0.60)
Mainline
3 (3)
2,400 (3,600)
B (C)
0.40 (0.60)
Mainline
3 (3)
3,500 (2,300)
C (B)
0.58 (0.38)
Mainline
3 (3)
2,650 (4,150)
C (D)
0.44 (0.69)
Mainline
3 (2)
3,875 (3,075)
D (D)
0.64 (0.77)
Mainline
2 (2)
3,100 (3,925)
D (E)
0.78 (0.98)
Mainline
2 (2)
2,875 (3,375)
D (E)
0.75 (0.88)
Mainline
2 (2)
2,425 (3,425)
D (E)
0.63 (0.89)
Mainline
2 (2)
3,500 (3,150)
E (E)
0.88 (0.79)
Mainline
2 (2)
3,225 (2,975)
E (D)
0.81 (0.75)
Mainline
2 (2)
3,275 (2,650)
E (D)
0.82 (0.66)
Monocacy MARC Station
Frederick MARC Station
MARC
CSX
Buckeystown Pike
Bauer Valley Rd.
Bail Rd.
Rosemont Ave.
7th St.
Motter Ave.
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)


Matchline Plate 4
N
Mainline
2 (2)
3,100 (2,125)
D (C)
0.77 (0.53)
Mainline
2 (2)
1,825 (3,250)
C (E)
0.45 (0.81)
Mainline
2 (2)
1,750 (1,050)
B (A)
0.42 (0.25)
Mainline
2 (2)
2,225 (925)
C (A)
0.54 (0.23)
Mainline
2 (2)
1,100 (2,050)
B (C)
0.28 (0.52)
Mainline
2 (2)
750 (2,250)
A (C)
0.18 (0.55)
Mainline
2 (2)
2,250 (950)
C (A)
0.55 (0.23)
Mainline
2 (2)
750 (2,200)
A (C)
0.18 (0.54)
Highway Study Limit
Hayward Rd.
Willow Rd
Sunday Ln
Biggs Ford Rd.
Old Frederick Rd.
Devilbiss Bridge Rd.
Dublin Rd.
Masser Rd.
US 15
MARYLAND 144
MARYLAND 355
MARYLAND 26
MARYLAND 194
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR EXISTING (1998) CONDITIONS
MTA Maryland
DATE
MAY 2002
FIGURE
IV-6
PLATE 5 OF 5



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

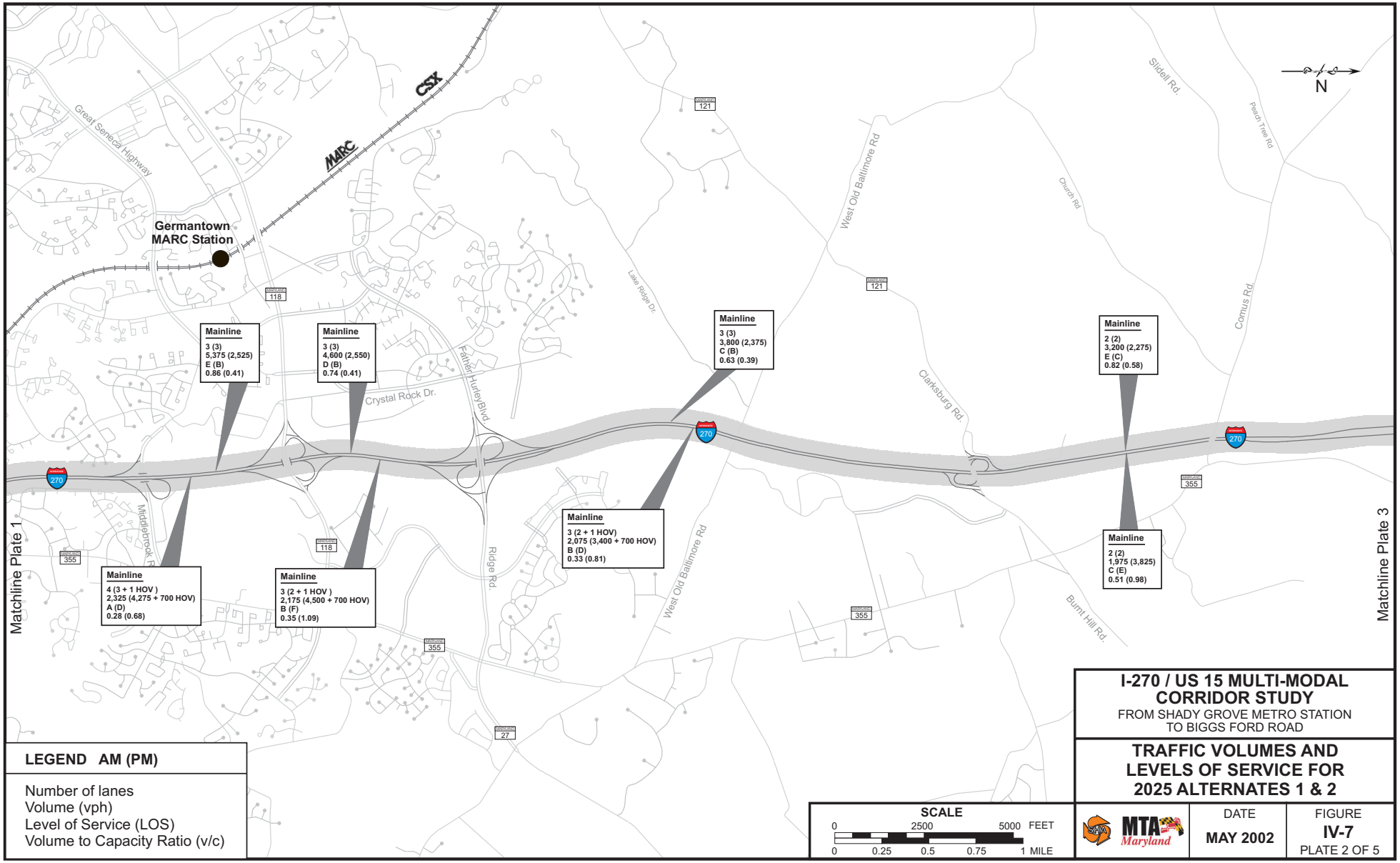
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 1 & 2

MTA Maryland

DATE
MAY 2002

FIGURE
IV-7
PLATE 1 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

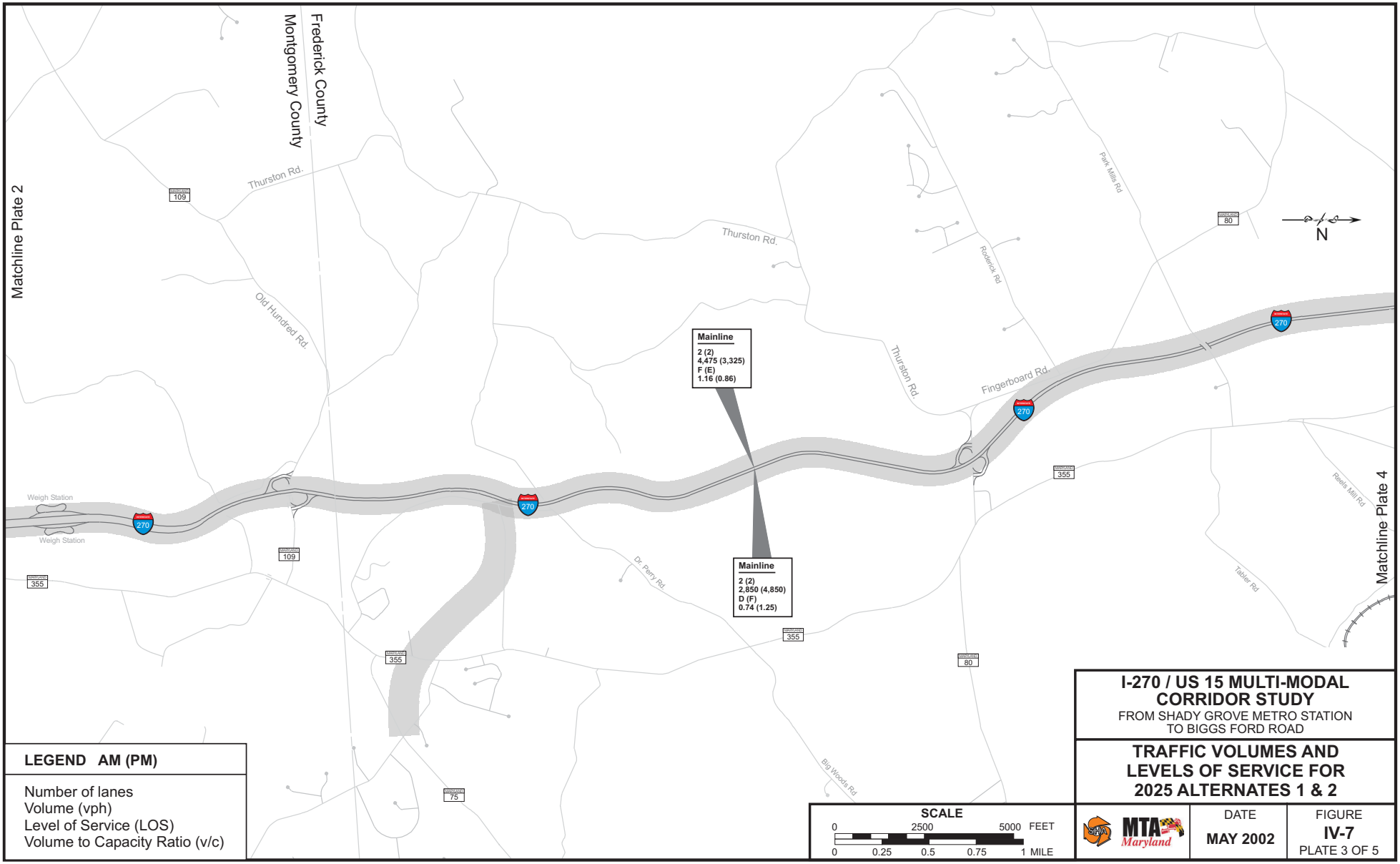
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 1 & 2

MTA Maryland

DATE
MAY 2002

FIGURE
IV-7
PLATE 2 OF 5



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE

0 2500 5000 FEET

0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

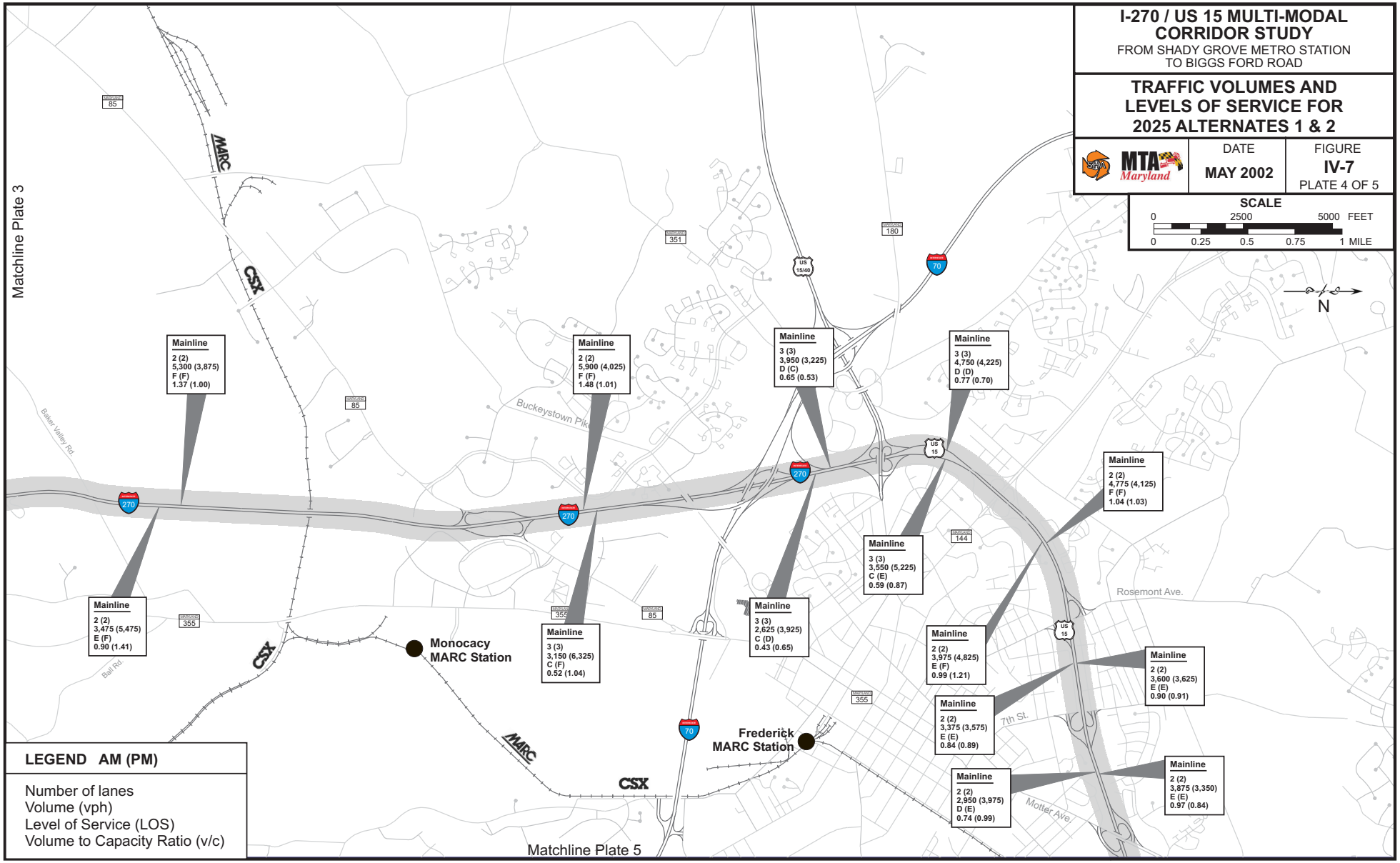
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

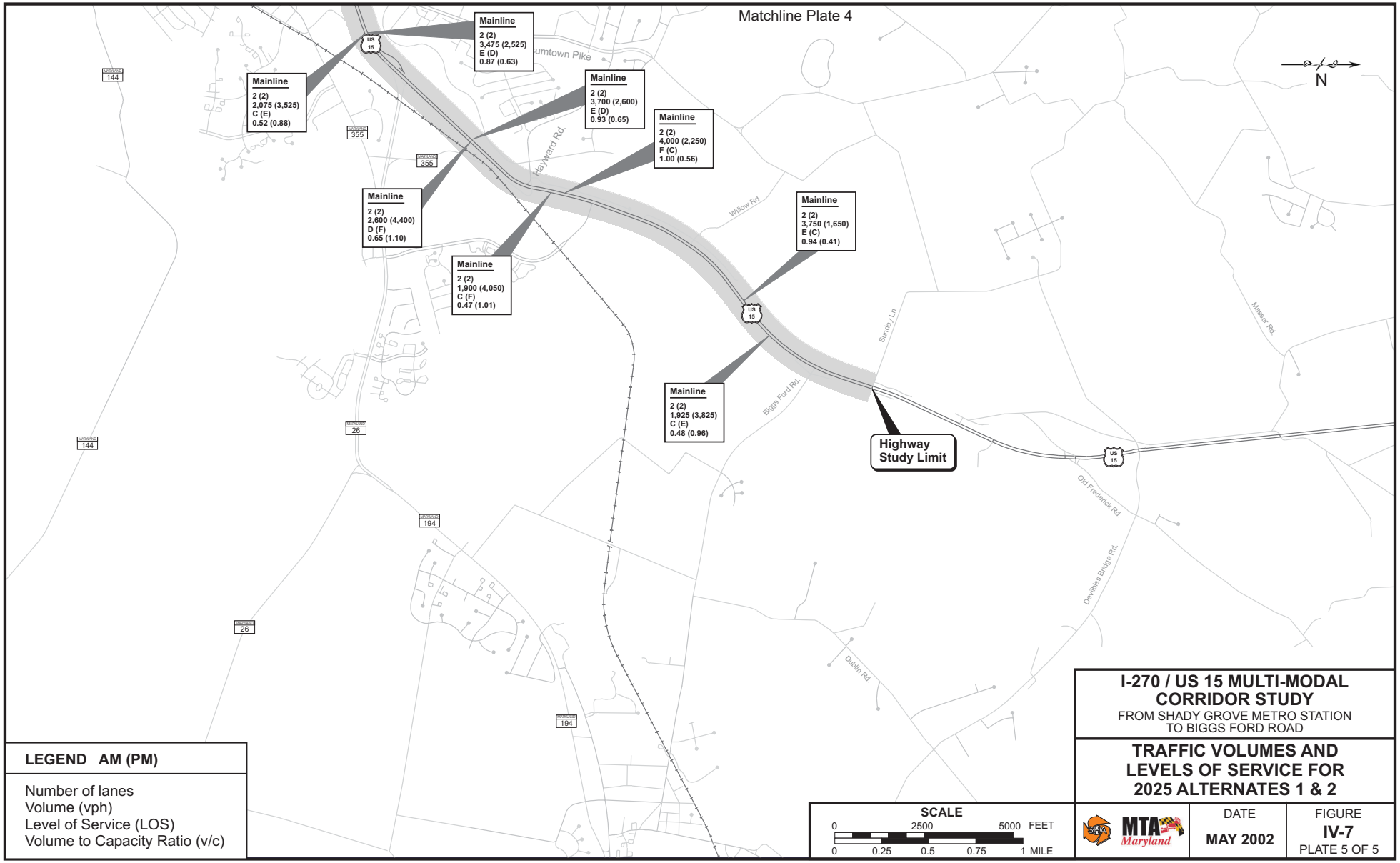
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 1 & 2

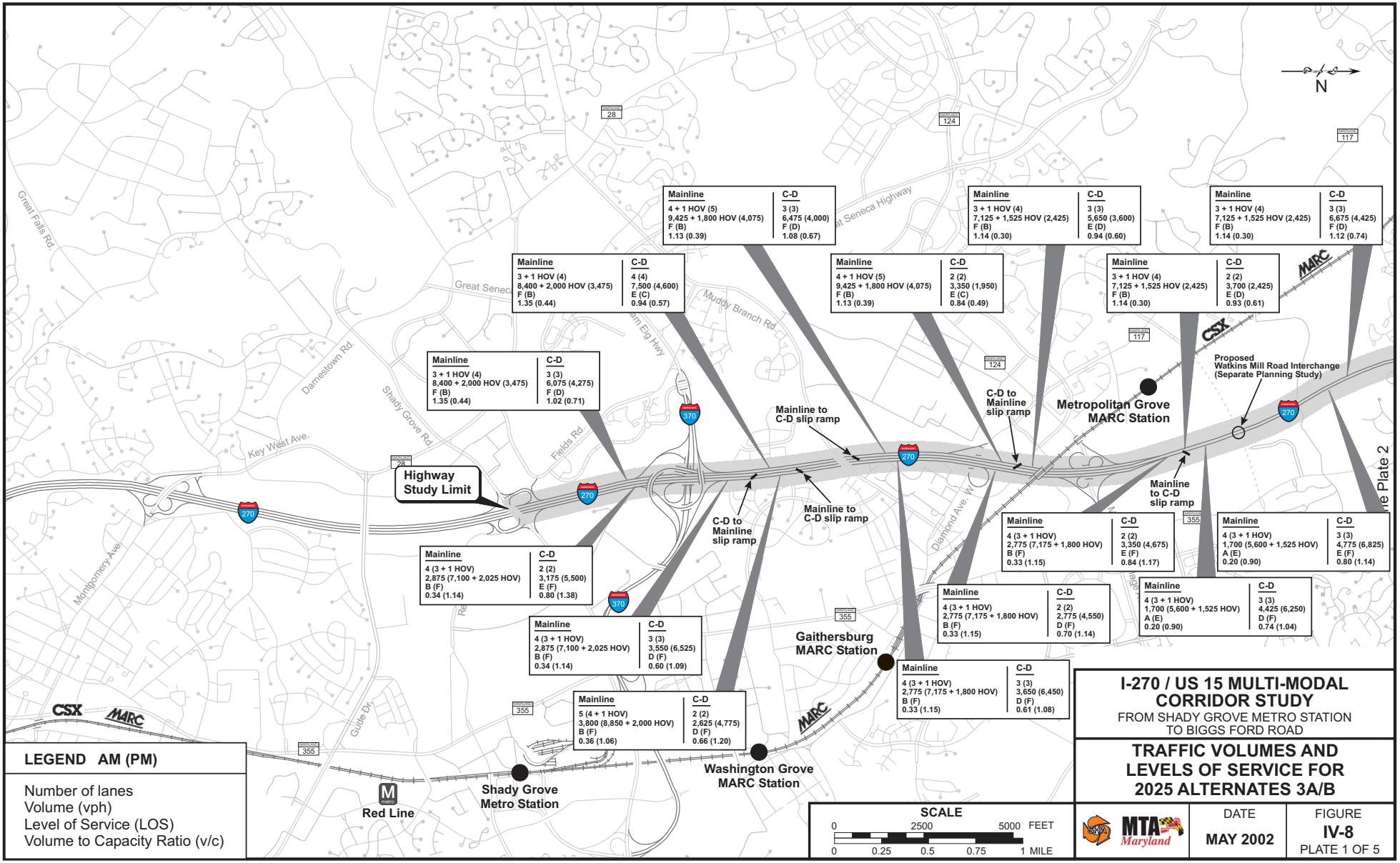
SHA MTA Maryland

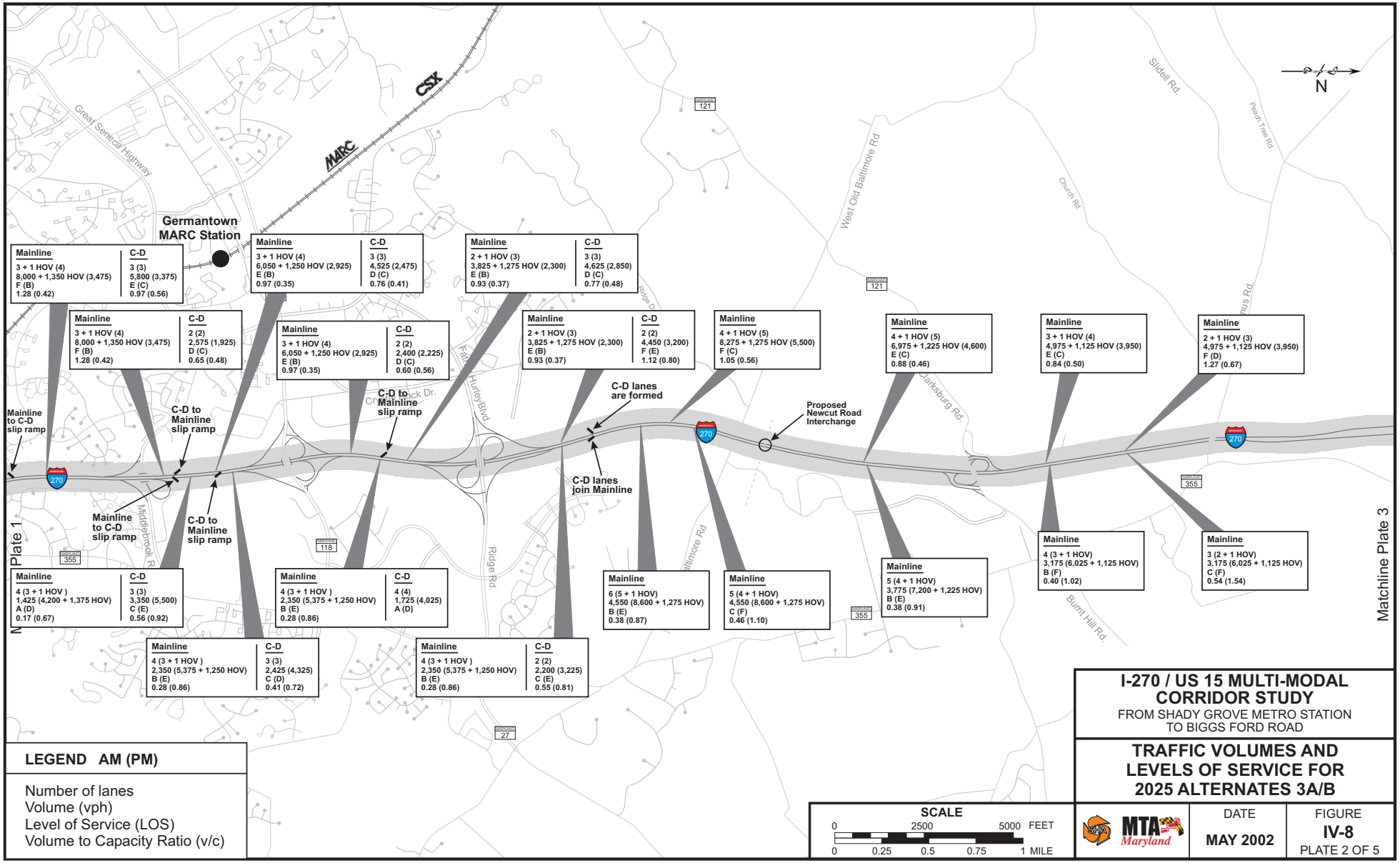
DATE
MAY 2002

FIGURE
IV-7
PLATE 3 OF 5


I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 1 & 2
MTA Maryland
DATE
MAY 2002
FIGURE
IV-7
PLATE 4 OF 5
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
N
Matchline Plate 3
Matchline Plate 5
Mainline
2 (2)
5,300 (3,875)
F (F)
1.37 (1.00)
Mainline
2 (2)
5,900 (4,025)
F (F)
1.48 (1.01)
Mainline
3 (3)
3,950 (3,225)
D (C)
0.65 (0.53)
Mainline
3 (3)
4,750 (4,225)
D (D)
0.77 (0.70)
Mainline
2 (2)
4,775 (4,125)
F (F)
1.04 (1.03)
Mainline
3 (3)
3,550 (5,225)
C (E)
0.59 (0.87)
Mainline
2 (2)
3,475 (5,475)
E (F)
0.90 (1.41)
Mainline
3 (3)
3,150 (6,325)
C (F)
0.52 (1.04)
Mainline
3 (3)
2,625 (3,925)
C (D)
0.43 (0.65)
Mainline
2 (2)
3,975 (4,825)
E (F)
0.99 (1.21)
Mainline
2 (2)
3,600 (3,625)
E (E)
0.90 (0.91)
Mainline
2 (2)
3,375 (3,575)
E (E)
0.84 (0.89)
Mainline
2 (2)
2,950 (3,975)
D (E)
0.74 (0.99)
Mainline
2 (2)
3,875 (3,350)
E (E)
0.97 (0.84)
Monocacy MARC Station
Frederick MARC Station
MARC
CSX
Buckeystown Pike
Bauer Valley Rd.
Bail Rd.
Rosemont Ave.
7th St.
Motter Ave.
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)


Matchline Plate 4
N
Mainline
2 (2)
3,475 (2,525)
E (D)
0.87 (0.63)
Mainline
2 (2)
2,075 (3,525)
C (E)
0.52 (0.88)
Mainline
2 (2)
3,700 (2,600)
E (D)
0.93 (0.65)
Mainline
2 (2)
4,000 (2,250)
F (C)
1.00 (0.56)
Mainline
2 (2)
2,600 (4,400)
D (F)
0.65 (1.10)
Mainline
2 (2)
1,900 (4,050)
C (F)
0.47 (1.01)
Mainline
2 (2)
3,750 (1,650)
E (C)
0.94 (0.41)
Mainline
2 (2)
1,925 (3,825)
C (E)
0.48 (0.96)
Highway Study Limit
Hayward Rd.
Willow Rd
Sunday Ln
Biggs Ford Rd.
Old Frederick Rd.
Devilbiss Bridge Rd.
Dublin Rd.
Masser Rd.
US 15
MARYLAND 144
MARYLAND 355
MARYLAND 26
MARYLAND 194
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 1 & 2
MTA Maryland
DATE
MAY 2002
FIGURE
IV-7
PLATE 5 OF 5


N
Mainline
4 + 1 HOV (5)
9,425 + 1,800 HOV (4,075)
F (B)
1.13 (0.39)
C-D
3 (3)
6,475 (4,000)
F (D)
1.08 (0.67)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
3 (3)
5,650 (3,600)
E (D)
0.94 (0.60)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
3 (3)
6,675 (4,425)
F (D)
1.12 (0.74)
Mainline
3 + 1 HOV (4)
8,400 + 2,000 HOV (3,475)
F (B)
1.35 (0.44)
C-D
4 (4)
7,500 (4,600)
E (C)
0.94 (0.57)
Mainline
4 + 1 HOV (5)
9,425 + 1,800 HOV (4,075)
F (B)
1.13 (0.39)
C-D
2 (2)
3,350 (1,950)
E (C)
0.84 (0.49)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
2 (2)
3,700 (2,425)
E (D)
0.93 (0.61)
Mainline
3 + 1 HOV (4)
8,400 + 2,000 HOV (3,475)
F (B)
1.35 (0.44)
C-D
3 (3)
6,075 (4,275)
F (D)
1.02 (0.71)
Mainline to C-D slip ramp
C-D to Mainline slip ramp
Metropolitan Grove MARC Station
Proposed Watkins Mill Road Interchange (Separate Planning Study)
Mainline to C-D slip ramp
Highway Study Limit
C-D to Mainline slip ramp
Mainline to C-D slip ramp
Mainline
4 (3 + 1 HOV)
2,875 (7,100 + 2,025 HOV)
B (F)
0.34 (1.14)
C-D
2 (2)
3,175 (5,500)
E (F)
0.80 (1.38)
Mainline
4 (3 + 1 HOV)
2,875 (7,100 + 2,025 HOV)
B (F)
0.34 (1.14)
C-D
3 (3)
3,550 (6,525)
D (F)
0.60 (1.09)
Mainline
5 (4 + 1 HOV)
3,800 (8,850 + 2,000 HOV)
B (F)
0.36 (1.06)
C-D
2 (2)
2,625 (4,775)
D (F)
0.66 (1.20)
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
2 (2)
3,350 (4,675)
E (F)
0.84 (1.17)
Mainline
4 (3 + 1 HOV)
1,700 (5,600 + 1,525 HOV)
A (E)
0.20 (0.90)
C-D
3 (3)
4,775 (6,825)
E (F)
0.80 (1.14)
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
2 (2)
2,775 (4,550)
D (F)
0.70 (1.14)
Mainline
4 (3 + 1 HOV)
1,700 (5,600 + 1,525 HOV)
A (E)
0.20 (0.90)
C-D
3 (3)
4,425 (6,250)
D (F)
0.74 (1.04)
Gaithersburg MARC Station
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
3 (3)
3,650 (6,450)
D (F)
0.61 (1.08)
Great Falls Rd.
Great Seneca
Muddy Branch Rd.
Damestown Rd.
Shady Grove Rd.
Key West Ave.
Fields Rd.
Montgomery Ave.
Diamond Ave.
Gude Dr.
Great Seneca Highway
CSX
MARC
Red Line
Shady Grove Metro Station
Washington Grove MARC Station
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 3A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-8
PLATE 1 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

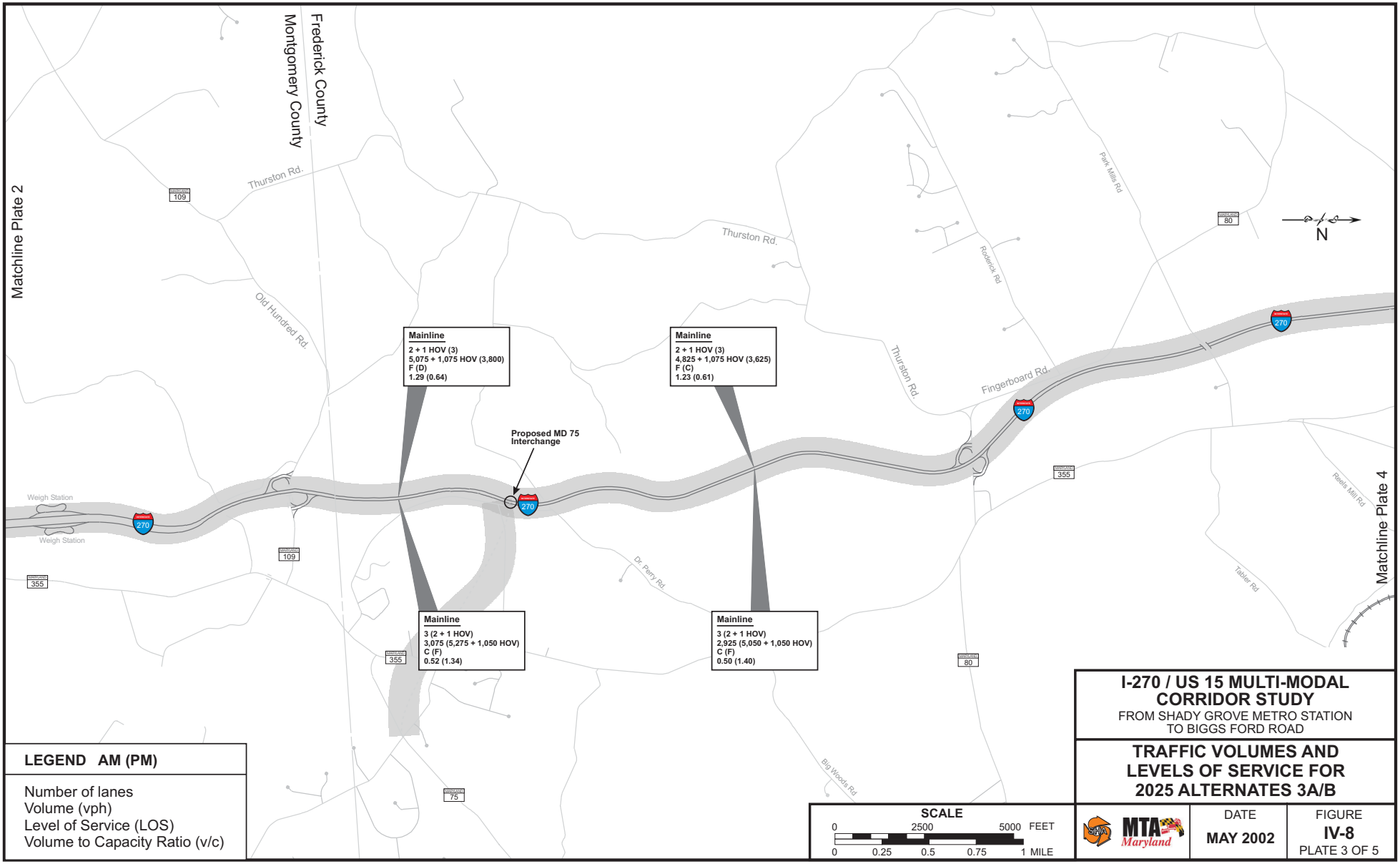
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 3A/B

MTA Maryland

DATE: MAY 2002

FIGURE: IV-8

PLATE 2 OF 5


Matchline Plate 2
Frederick County
Montgomery County
Thurston Rd.
Old Hundred Rd.
Thurston Rd.
Park Mills Rd
Roderick Rd
Thurston Rd.
Fingerboard Rd.
Proposed MD 75 Interchange
Mainline
2 + 1 HOV (3)
5,075 + 1,075 HOV (3,800)
F (D)
1.29 (0.64)
Mainline
2 + 1 HOV (3)
4,825 + 1,075 HOV (3,625)
F (C)
1.23 (0.61)
Mainline
3 (2 + 1 HOV)
3,075 (5,275 + 1,050 HOV)
C (F)
0.52 (1.34)
Mainline
3 (2 + 1 HOV)
2,925 (5,050 + 1,050 HOV)
C (F)
0.50 (1.40)
Weigh Station
Weigh Station
Dr. Perry Rd
Reeds Mill Rd
Tabler Rd
Big Woods Rd
Matchline Plate 4
N
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 3A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-8
PLATE 3 OF 5

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 3A/B

MTA Maryland

DATE
MAY 2002

FIGURE
IV-8
PLATE 4 OF 5

SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE

N

Matchline Plate 3

Matchline Plate 5

Mainline
2 + 1 HOV (3)
5,800 + 950 HOV (4,250)
F (D)
1.48 (0.72)

Mainline
3 + 1 HOV (4)
8,650 + 950 HOV (5,900)
F (D)
1.50 (0.76)

Mainline
4 (4)
5,425 (4,400)
D (C)
0.67 (0.54)

Mainline
4 (4)
6,450 (5,675)
F (E)

Mainline
4 (4)
6,000 (5,850)
D (D)
0.74 (0.72)

Mainline
4 (4)
4,625 (6,850)
C (E)

Mainline
4 (4)
3,675 (5,725)
C (F)

Mainline
4 (4)
5,450 (6,700)
D (E)
0.67 (0.83)

Mainline
4 (4)
5,225 (5,250)
D (D)
0.64 (0.65)

Mainline
4 (4)
4,650 (5,100)
C (C)

Mainline
4 (4)
3,775 (5,275)
C (D)
0.47 (0.65)

Mainline
4 (4)
5,300 (4,500)
D (C)

Mainline
3 (2 + 1 HOV)
3,700 (5,800 + 950 HOV)
C (F)
0.63 (1.48)

Mainline
3 (2 + 1 HOV)
1,300 (2,125 + 950 HOV)
A (C)
0.22 (0.54)

MD 85 / I-70 Ramp
3 (3)
2,400 (3,675)
C (D)

Mainline
4 (3 + 1 HOV)
2,425 (4,100 + 950 HOV)
B (D)
0.31 (0.71)

I-70 Ramp
3 (3)
2,000 (5,025)
B (E)

Monocacy MARC Station

Frederick MARC Station

Buckeystown Pike

Bauer Valley Rd.

Bail Rd.

Rosemont Ave.

7th St.

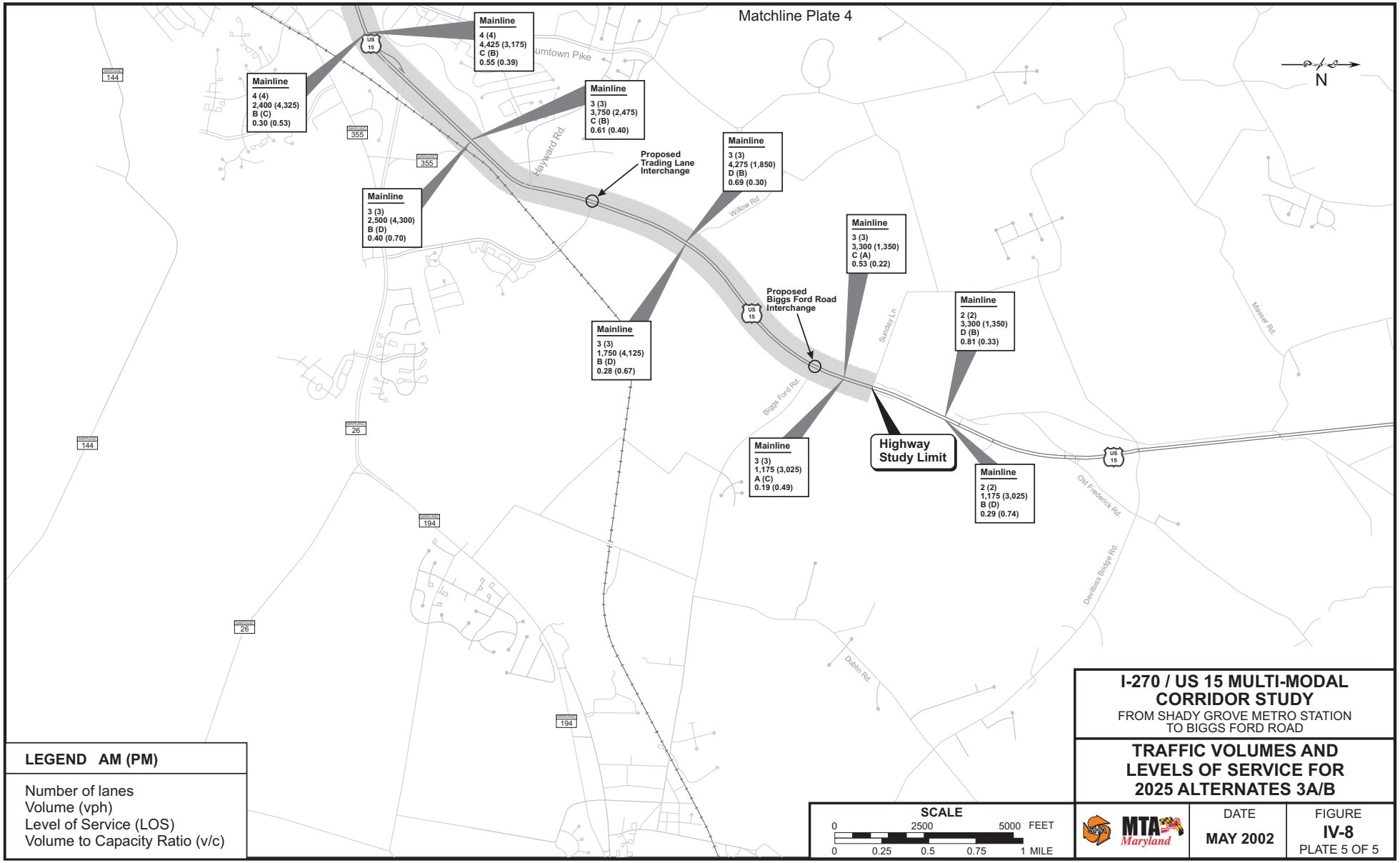
Motter Ave.

MARC

CSX

LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE

0 2500 5000 FEET

0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 3A/B

MTA Maryland

DATE
MAY 2002

FIGURE
IV-8
PLATE 5 OF 5

b. Alternates 4A/B

Projected peak hour traffic operations for Alternates 4A/B are the same as Alternates 3A/B south of MD 121 due to identical proposed improvements and traffic volumes. North of I-70, Alternates 4A/B are also projected to operate the same as Alternates 3A/B. Over the entire corridor study area, the proposed improvements with Alternates 4A/B result in approximately eleven fewer miles of LOS F operations northbound and approximately twelve fewer miles of LOS F operations southbound than under the No-Build conditions. Therefore Alternates 4A/B offer a greater reduction in the miles of LOS Fin both the northbound and southbound directions, as compared to Alternates 3A/B or Alternates 1 & 2.

Differences between Alternates 3A/B and 4A/B occur North of MD 121, where an additional general-purpose lane is added in each direction. The northbound direction of I-270 is projected to operate at LOS F between the MD 121 and MD 109 interchanges, LOS E between MD 109 and MD 80, LOS F between MD 80 and MD 85, and LOS C between MD 85 and I-70. The southbound direction will operate at LOS E between MD 121 and MD 80 and LOS F between MD 80 and I-70.

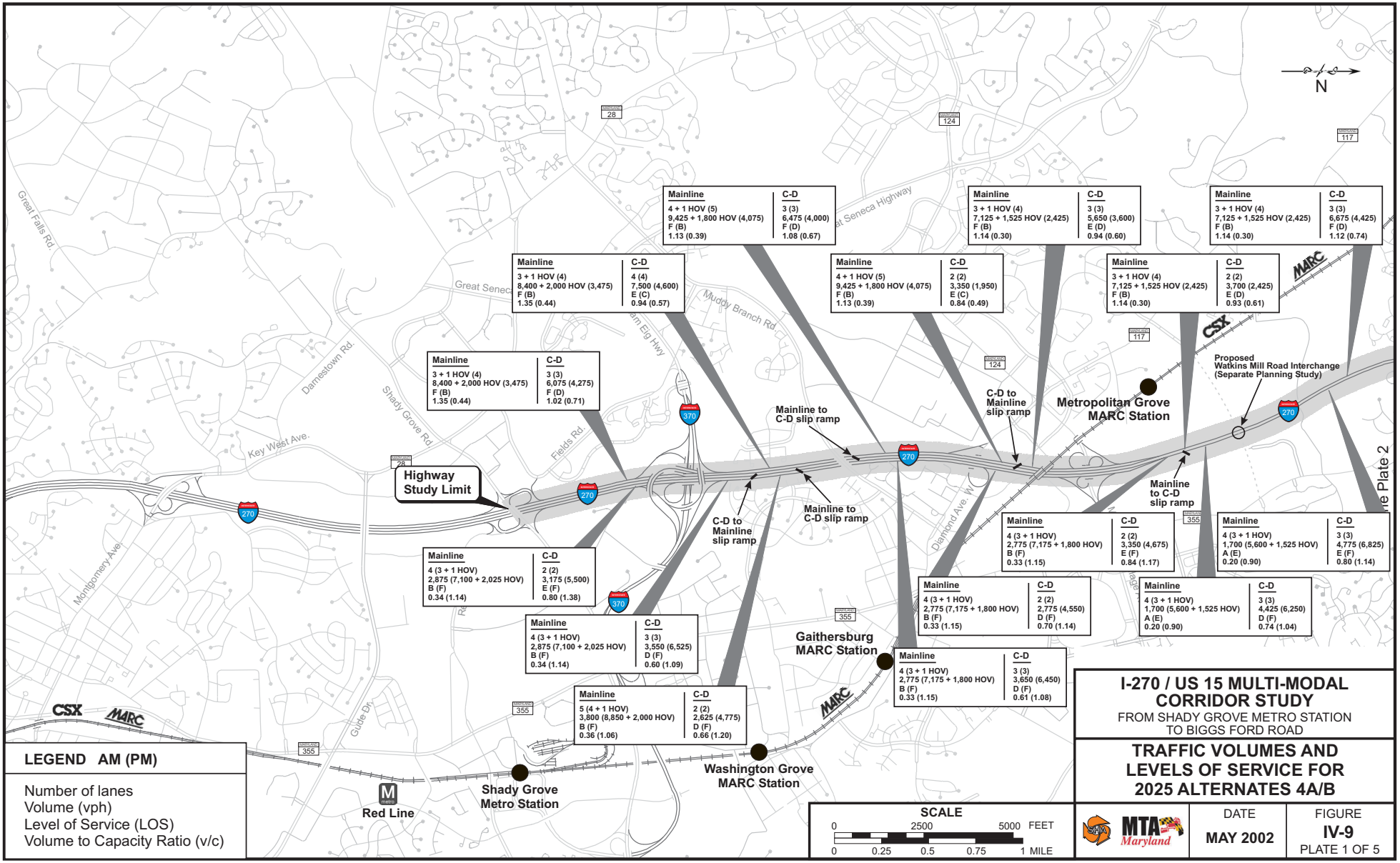
Figure IV-9 indicates traffic volumes, number of lanes, LOS, and volume to capacity ratios for Alternates 4A/B.

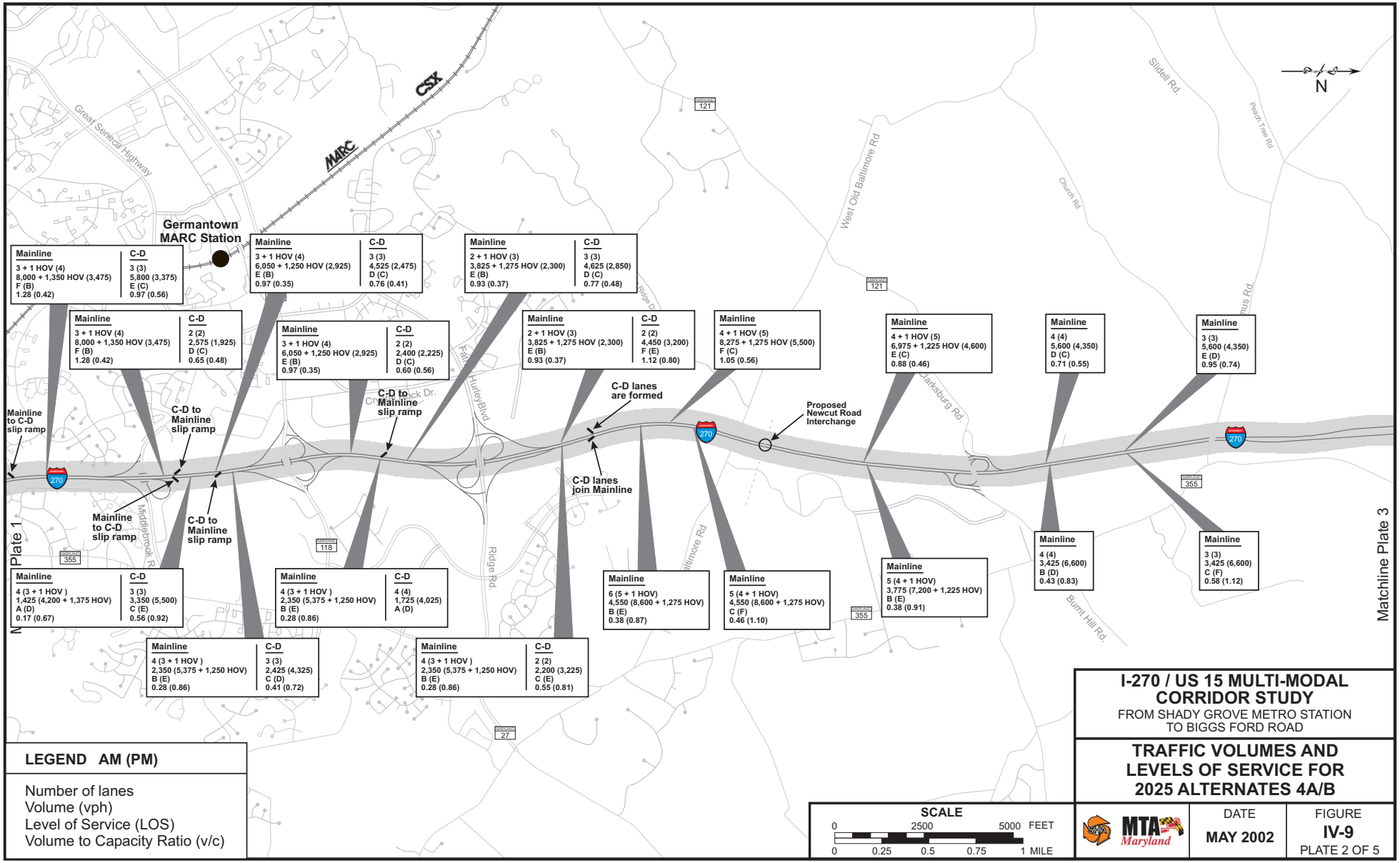
c. Alternates 5A/B/C

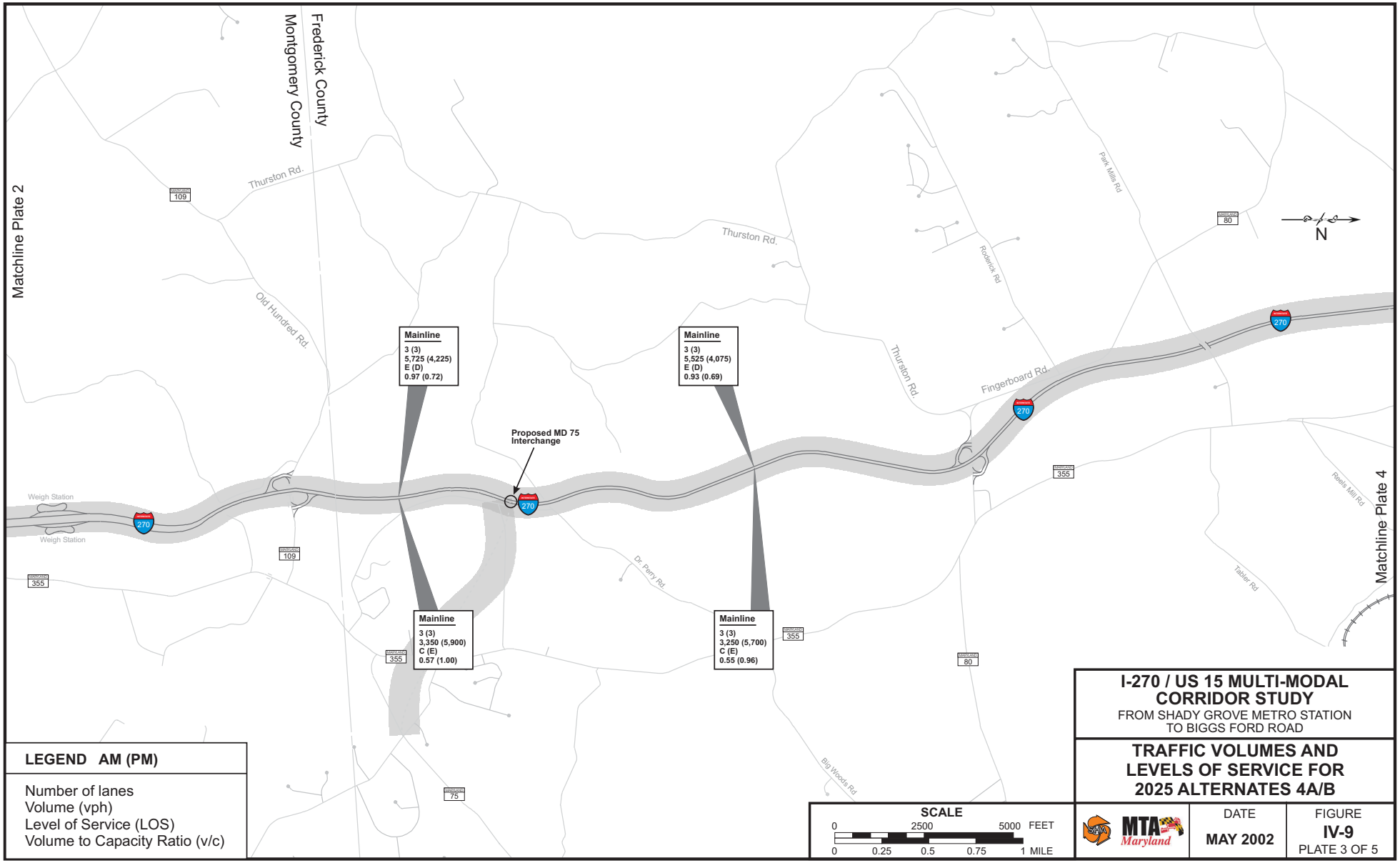
Over the entire corridor study area, the proposed improvements with Alternates 5A/B/C result in approximately seven fewer miles of LOS F operations northbound and approximately eleven fewer miles of LOS F operations southbound than under the No-Build conditions. Therefore, Alternates 5A/B/C offer a greater reduction in the miles of LOS F in the southbound direction as compared to Alternates 3A/B or Alternates 1 and 2, but only offers a greater reduction in miles of LOS F in the northbound direction over Alternates 1 and 2. Alternates 4A/B continue to offer the greatest reduction in miles of LOS F along the corridor.

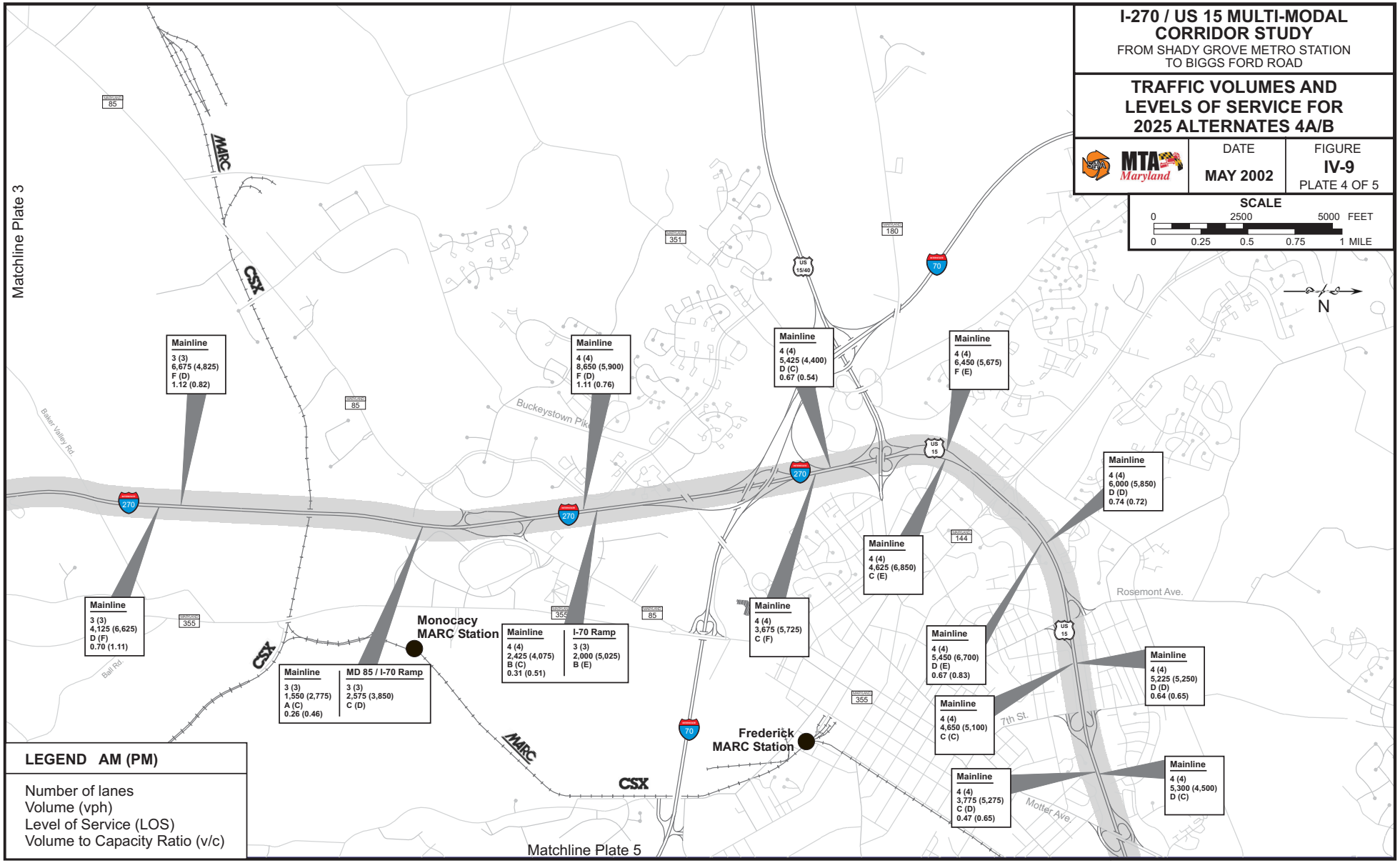
In the northbound direction, projected peak hour traffic operations for Alternates 5A/B/C are similar to Alternates 3A/B and 4A/B south of MD 121. The northbound level of service is the same south of MD 121; however, the v/c ratios are generally higher for Alternate 5 A/B/C. The mainline will operate at LOS F between MD 121 and MD 85 and LOS D between MD 85 and I-70, which is similar to Alternates 3A/B but generally with lower v/c ratios. North of I-70, Alternates 5A/B/C will operate the same as Alternates 3A/B and 4A/B, with the exception of the segment between Jefferson Street and US 40/MD 144, where the mainline is projected to operate at LOS F.

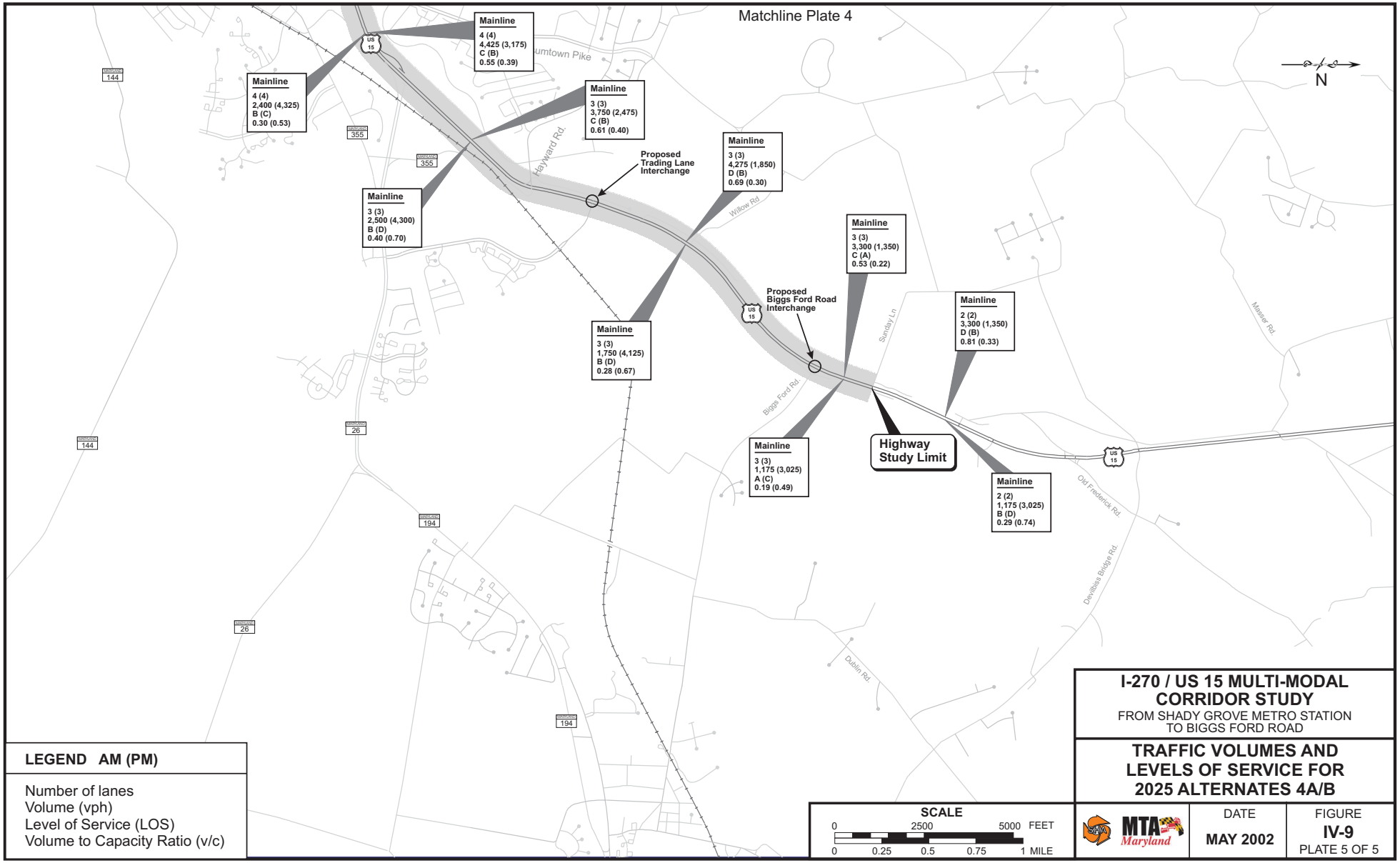
In the southbound direction, projected traffic operations for Alternates 5A/B/C are the same as Alternates 3A/B and 4A/B, with the exception of the segment between Father Hurley Boulevard and MD 118, where the mainline is projected to operate at LOS F. The mainline will operate at LOS E between MD 121 and MD 80, and LOS F between MD 80 and I-70. North of I-70, Alternates 5A/B/C will operate the same as Alternates 3A/B and 4A/B.


N
Mainline
4 + 1 HOV (5)
9,425 + 1,800 HOV (4,075)
F (B)
1.13 (0.39)
C-D
3 (3)
6,475 (4,000)
F (D)
1.08 (0.67)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
3 (3)
5,650 (3,600)
E (D)
0.94 (0.60)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
3 (3)
6,675 (4,425)
F (D)
1.12 (0.74)
Mainline
3 + 1 HOV (4)
8,400 + 2,000 HOV (3,475)
F (B)
1.35 (0.44)
C-D
4 (4)
7,500 (4,600)
E (C)
0.94 (0.57)
Mainline
4 + 1 HOV (5)
9,425 + 1,800 HOV (4,075)
F (B)
1.13 (0.39)
C-D
2 (2)
3,350 (1,950)
E (C)
0.84 (0.49)
Mainline
3 + 1 HOV (4)
7,125 + 1,525 HOV (2,425)
F (B)
1.14 (0.30)
C-D
2 (2)
3,700 (2,425)
E (D)
0.93 (0.61)
Mainline
3 + 1 HOV (4)
8,400 + 2,000 HOV (3,475)
F (B)
1.35 (0.44)
C-D
3 (3)
6,075 (4,275)
F (D)
1.02 (0.71)
Mainline to C-D slip ramp
C-D to Mainline slip ramp
Mainline to C-D slip ramp
C-D to Mainline slip ramp
Mainline to C-D slip ramp
Proposed Watkins Mill Road Interchange (Separate Planning Study)
Metropolitan Grove MARC Station
Highway Study Limit
Mainline
4 (3 + 1 HOV)
2,875 (7,100 + 2,025 HOV)
B (F)
0.34 (1.14)
C-D
2 (2)
3,175 (5,500)
E (F)
0.80 (1.38)
Mainline
4 (3 + 1 HOV)
2,875 (7,100 + 2,025 HOV)
B (F)
0.34 (1.14)
C-D
3 (3)
3,550 (6,525)
D (F)
0.60 (1.09)
Mainline
5 (4 + 1 HOV)
3,800 (8,850 + 2,000 HOV)
B (F)
0.36 (1.06)
C-D
2 (2)
2,625 (4,775)
D (F)
0.66 (1.20)
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
2 (2)
3,350 (4,675)
E (F)
0.84 (1.17)
Mainline
4 (3 + 1 HOV)
1,700 (5,600 + 1,525 HOV)
A (E)
0.20 (0.90)
C-D
3 (3)
4,775 (6,825)
E (F)
0.80 (1.14)
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
2 (2)
2,775 (4,550)
D (F)
0.70 (1.14)
Mainline
4 (3 + 1 HOV)
1,700 (5,600 + 1,525 HOV)
A (E)
0.20 (0.90)
C-D
3 (3)
4,425 (6,250)
D (F)
0.74 (1.04)
Gaithersburg MARC Station
Mainline
4 (3 + 1 HOV)
2,775 (7,175 + 1,800 HOV)
B (F)
0.33 (1.15)
C-D
3 (3)
3,650 (6,450)
D (F)
0.61 (1.08)
Great Falls Rd.
Great Seneca
Muddy Branch Rd.
Damestown Rd.
Shady Grove Rd.
Key West Ave.
Fields Rd.
Montgomery Ave.
Diamond Ave.
Gude Dr.
CSX
MARC
Red Line
Shady Grove Metro Station
Washington Grove MARC Station
Plate 2
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 4A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-9
PLATE 1 OF 5


Germantown MARC Station
CSX
MARC
Great Seneca Highway
West Old Baltimore Rd
Slidell Rd.
Peach Tree Rd
Church Rd
Clarksburg Rd.
Burnt Hill Rd.
Ridge Rd.
Fairfield Dr.
Hurley Blvd
Middlebrook Rd
Proposed Newcut Road Interchange
C-D lanes are formed
C-D lanes join Mainline
C-D to Mainline slip ramp
Mainline to C-D slip ramp
N
Plate 1
Matchline Plate 3
Mainline
3 + 1 HOV (4)
8,000 + 1,350 HOV (3,475)
F (B)
1.28 (0.42)
C-D
3 (3)
5,800 (3,375)
E (C)
0.97 (0.56)
Mainline
3 + 1 HOV (4)
6,050 + 1,250 HOV (2,925)
E (B)
0.97 (0.35)
C-D
3 (3)
4,525 (2,475)
D (C)
0.76 (0.41)
Mainline
2 + 1 HOV (3)
3,825 + 1,275 HOV (2,300)
E (B)
0.93 (0.37)
C-D
3 (3)
4,625 (2,850)
D (C)
0.77 (0.48)
Mainline
3 + 1 HOV (4)
8,000 + 1,350 HOV (3,475)
F (B)
1.28 (0.42)
C-D
2 (2)
2,575 (1,925)
D (C)
0.65 (0.48)
Mainline
3 + 1 HOV (4)
6,050 + 1,250 HOV (2,925)
E (B)
0.97 (0.35)
C-D
2 (2)
2,400 (2,225)
D (C)
0.60 (0.56)
Mainline
2 + 1 HOV (3)
3,825 + 1,275 HOV (2,300)
E (B)
0.93 (0.37)
C-D
2 (2)
4,450 (3,200)
F (E)
1.12 (0.80)
Mainline
4 + 1 HOV (5)
8,275 + 1,275 HOV (5,500)
F (C)
1.05 (0.56)
Mainline
4 + 1 HOV (5)
6,975 + 1,225 HOV (4,600)
E (C)
0.88 (0.46)
Mainline
4 (4)
5,600 (4,350)
D (C)
0.71 (0.55)
Mainline
3 (3)
5,600 (4,350)
E (D)
0.95 (0.74)
Mainline
4 (3 + 1 HOV)
1,425 (4,200 + 1,375 HOV)
A (D)
0.17 (0.67)
C-D
3 (3)
3,350 (5,500)
C (E)
0.56 (0.92)
Mainline
4 (3 + 1 HOV)
2,350 (5,375 + 1,250 HOV)
B (E)
0.28 (0.86)
C-D
4 (4)
1,725 (4,025)
A (D)
Mainline
4 (3 + 1 HOV)
2,350 (5,375 + 1,250 HOV)
B (E)
0.28 (0.86)
C-D
3 (3)
2,425 (4,325)
C (D)
0.41 (0.72)
Mainline
4 (3 + 1 HOV)
2,350 (5,375 + 1,250 HOV)
B (E)
0.28 (0.86)
C-D
2 (2)
2,200 (3,225)
C (E)
0.55 (0.81)
Mainline
6 (5 + 1 HOV)
4,550 (8,600 + 1,275 HOV)
B (E)
0.38 (0.87)
Mainline
5 (4 + 1 HOV)
4,550 (8,600 + 1,275 HOV)
C (F)
0.46 (1.10)
Mainline
5 (4 + 1 HOV)
3,775 (7,200 + 1,225 HOV)
B (E)
0.38 (0.91)
Mainline
4 (4)
3,425 (6,600)
B (D)
0.43 (0.83)
Mainline
3 (3)
3,425 (6,600)
C (F)
0.58 (1.12)
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 4A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-9
PLATE 2 OF 5


Matchline Plate 2
Frederick County
Montgomery County
Thurston Rd.
Old Hundred Rd.
Thurston Rd.
Park Mills Rd
Roderick Rd
Thurston Rd.
Fingerboard Rd.
Proposed MD 75 Interchange
Mainline
3 (3)
5,725 (4,225)
E (D)
0.97 (0.72)
Mainline
3 (3)
5,525 (4,075)
E (D)
0.93 (0.69)
Mainline
3 (3)
3,350 (5,900)
C (E)
0.57 (1.00)
Mainline
3 (3)
3,250 (5,700)
C (E)
0.55 (0.96)
Weigh Station
Weigh Station
Dr. Perry Rd
Reels Mill Rd
Tabler Rd
Big Woods Rd
Matchline Plate 4
N
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 4A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-9
PLATE 3 OF 5


I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 4A/B
MTA Maryland
DATE
MAY 2002
FIGURE
IV-9
PLATE 4 OF 5
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
N
Matchline Plate 3
Matchline Plate 5
Mainline
3 (3)
6,675 (4,825)
F (D)
1.12 (0.82)
Mainline
4 (4)
8,650 (5,900)
F (D)
1.11 (0.76)
Mainline
4 (4)
5,425 (4,400)
D (C)
0.67 (0.54)
Mainline
4 (4)
6,450 (5,675)
F (E)
Mainline
4 (4)
6,000 (5,850)
D (D)
0.74 (0.72)
Mainline
4 (4)
4,625 (6,850)
C (E)
Mainline
3 (3)
4,125 (6,625)
D (F)
0.70 (1.11)
Mainline
4 (4)
3,675 (5,725)
C (F)
Mainline
4 (4)
5,450 (6,700)
D (E)
0.67 (0.83)
Mainline
4 (4)
5,225 (5,250)
D (D)
0.64 (0.65)
Mainline
4 (4)
4,650 (5,100)
C (C)
Mainline
4 (4)
3,775 (5,275)
C (D)
0.47 (0.65)
Mainline
4 (4)
5,300 (4,500)
D (C)
Monocacy MARC Station
Mainline
4 (4)
2,425 (4,075)
B (C)
0.31 (0.51)
I-70 Ramp
3 (3)
2,000 (5,025)
B (E)
Mainline
3 (3)
1,550 (2,775)
A (C)
0.26 (0.46)
MD 85 / I-70 Ramp
3 (3)
2,575 (3,850)
C (D)
Frederick MARC Station
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)
MARC
CSX
Buckeystown Pike
Bauer Valley Rd.
Bail Rd.
Rosemont Ave.
7th St.
Motter Ave.



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE

0 2500 5000 FEET

0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 4A/B

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DATE
MAY 2002

FIGURE
IV-9
PLATE 5 OF 5

Figure IV-10 indicates traffic volumes, number of lanes, LOS, and volume to capacity ratios for Alternates 5A/B/C.

4. Corridor and Ramp Terminal Intersection Impacts

a. Corridor Intersections

In addition to reviewing the highway mainline and interchanges, a number of representative intersections along the corridor that are anticipated to be affected by the highway and transitway improvements were evaluated. The intersections were selected from a preliminary list of approximately 130 intersections along the proposed transitway alignment (which originally extended to Frederick) and along each side of I-270 and US 15 throughout the corridor. Due to the significant time and cost to analyze this many intersections (and also since the northern terminus of the proposed transitway alignment was reduced from Frederick to south of Clarksburg at COMSAT), the list was shortened to approximately 47 intersections as listed in **Table IV-14**. The primary rationale used for selection was to choose those intersections that would be most adversely affected by the proposed highway and transitway alternates. In general, the intersections selected are located near a proposed transitway station or crossing, or on either side of an I-270/US 15 interchange. **Table IV-14** also highlights the corridor intersections selected for more detailed analyses (presented in **Table IV-16**).

TABLE IV-14
CORRIDOR INTERSECTIONS

Intersection	1998 Existing			
	AM		PM	
	LOS	V/C	LOS	V/C
1. Thomas Johnson Drive/Opossumtown Pike	A	0.49	B	0.69
2. US 40/Baughmans Lane	E	0.92	E	0.94
3. MD 85/Crestwood Boulevard	E	0.95	F	2.09
4. MD 85/Spectrum Drive	A	0.31	E	0.91
5. West Patrick Street/Jefferson Street	A	0.32	A	0.54
6. MD 80 west/MD 355	D	0.90	D	0.88
7. MD 80 east/MD 355	D	0.89	D	0.85
8. MD 75(west)/MD 80	A	0.39	A	0.44
9. MD 75(east)/MD 80	A	0.26	A	0.42
10. MD 27/MD 80	C	0.76	A	0.54
11. MD 75/MD 355	A	0.57	A	0.31
12. MD 355/MD 109	A	0.46	A	0.61
13. MD 355/Comus Road	A	0.59	A	0.37
14. MD 121/MD 355	C	0.75	A	0.59
15. MD 121/West Old Baltimore Road	A	0.14	A	0.14
16. Father Hurley Boulevard /MD 355	C	0.76	B	0.64
17. Father Hurley Boulevard/Crystal Rock Drive	F	1.03	B	0.70
18. MD 118/MD 355	A	0.50	A	0.53
19. MD 118/Crystal Rock Drive	A	0.55	E	0.94
20. MD 118/Observation Drive	A	0.39	A	0.45
21. Father Hurley Boulevard/Middlebrook Road	B	0.64	C	0.74
22. Jefferson Street/Prospect Boulevard	B	0.66	A	0.55

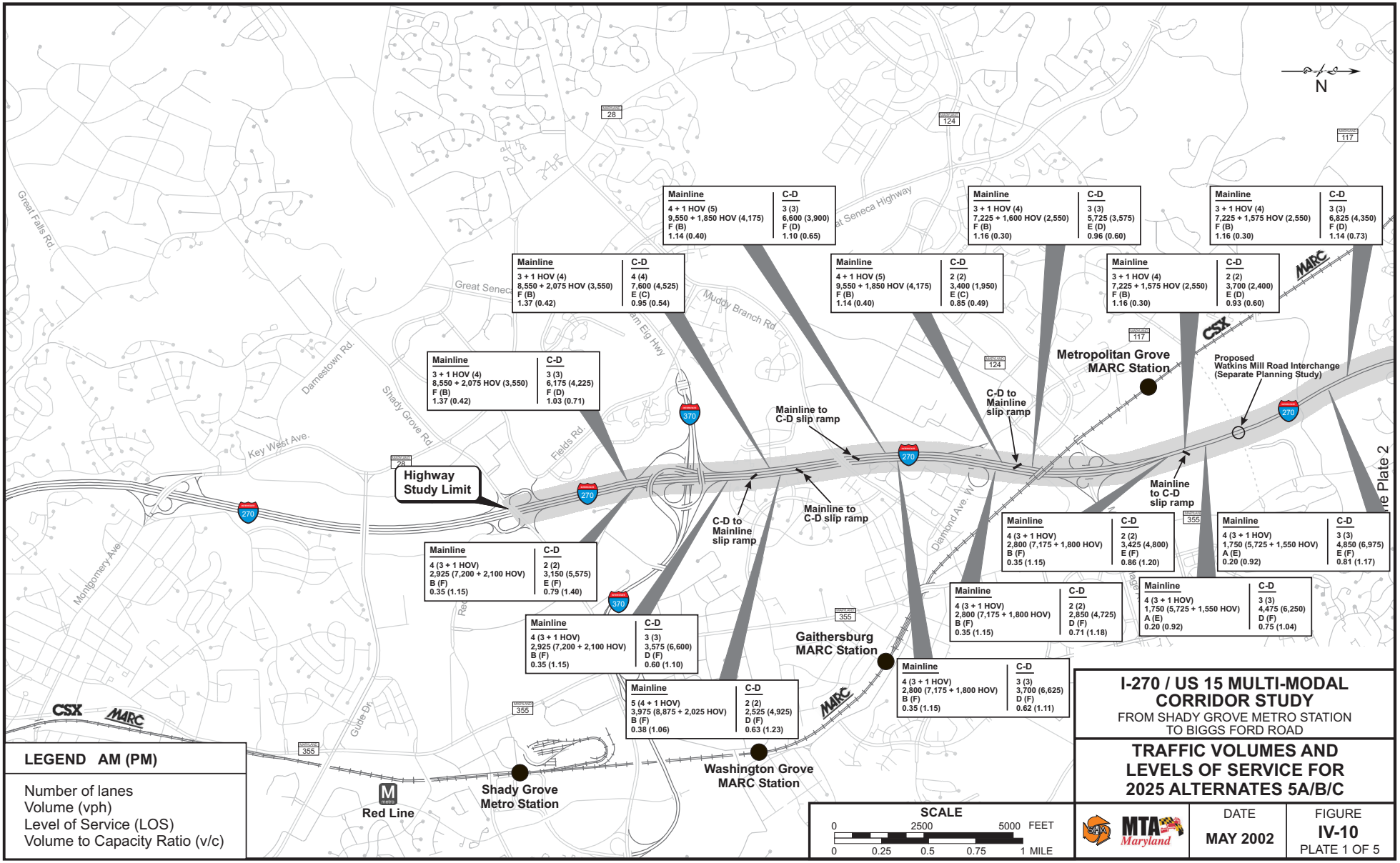
TABLE IV-14 (CONTINUED)
CORRIDOR INTERSECTIONS

Intersection	1998 Existing			
	AM		PM	
	LOS	V/C	LOS	V/C
22. MD 118/Middlebrook Road	A	0.55	A	0.62
23. Middlebrook Road/Waring Station Road	D	0.90	D	0.90
24. Middlebrook Road/Great Seneca Highway	A	0.47	A	0.57
25. Middlebrook Road/MD 355	F	1.15	E	0.94
26. Watkins Mill Road/MD 355	A	0.36	A	0.54
27. Watkins Mill Road/MD 117	C	0.79	B	0.65
28. MD 117/Perry Parkway	F	1.37	F	1.45
29. MD 117/Bureau Drive	E	0.95	E	0.96
30. MD 117/MD 355				
Eastbound MD 117 to southbound MD 355	B	N/A	B	N/A
Southbound MD 355 to westbound MD 117	B	N/A	A	N/A
Northbound MD 355 to eastbound MD 117	B	N/A	C	N/A
Westbound MD 117 to northbound MD 355	B	N/A	C	N/A
31. MD 124/MD 117	C	0.77	F	1.02
32. MD 124/Firstfield Road	A	N/A	D	0.82
33. Montgomery Village Avenue/MD 355	F	1.10	F	1.19
34. Sam Eig Highway/Fields Road	A	0.59	A	0.56
35. Sam Eig Highway/MD 355	N/A	N/A	N/A	N/A
36. Shady Grove Road/Key West Avenue/Gude Drive	B	0.66	D	0.86
37. Shady Grove Road/Research Drive	E	0.97	D	0.82
38. Shady Grove Road/MD 355	F	1.06	F	1.05
39. Shady Grove Road/Gaither Road	C	0.76	E	0.91
40. Redland Road/MD 355	F	1.08	F	1.14
41. Redland Road/Gaither Road	A	0.40	A	0.38
42. Redland Road/Piccard Drive	A	0.46	A	0.49
43. Gude Drive/Research Boulevard	D	0.81	C	0.80
44. MD 28/MD 124	D	0.89	A	0.62
45. MD 28/Shady Grove Road	B	0.71	A	0.52
46. Muddy Branch Road/Great Seneca Highway	F	1.13	F	1.16
47. MD 26/Trading Lane	A	0.56	B	0.70

Note: *Shaded rows indicate those intersections evaluated in more detail in this study.*

b. Ramp Terminal Intersections

The ramp terminal intersections were selected based on a review of the existing (1998), 2025 No-Build and 2025 build traffic volume scenarios. Each ramp terminal along the I-270/US 15 corridor within the project area was evaluated, as shown in **Table IV-15**. The shaded intersections represent those analyzed in further detail.



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

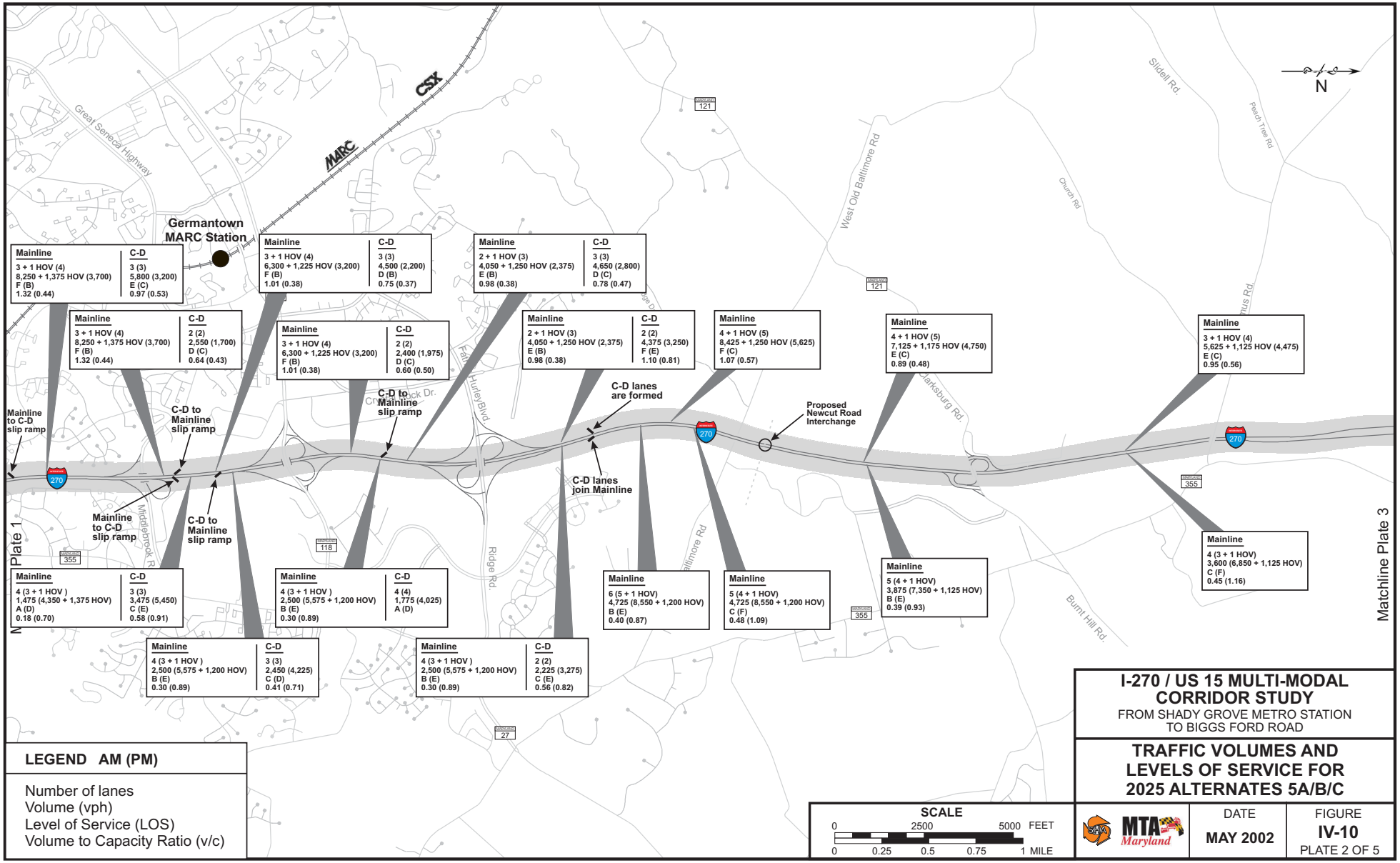
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 5A/B/C

MTA Maryland

DATE
MAY 2002

FIGURE
IV-10
PLATE 1 OF 5



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD

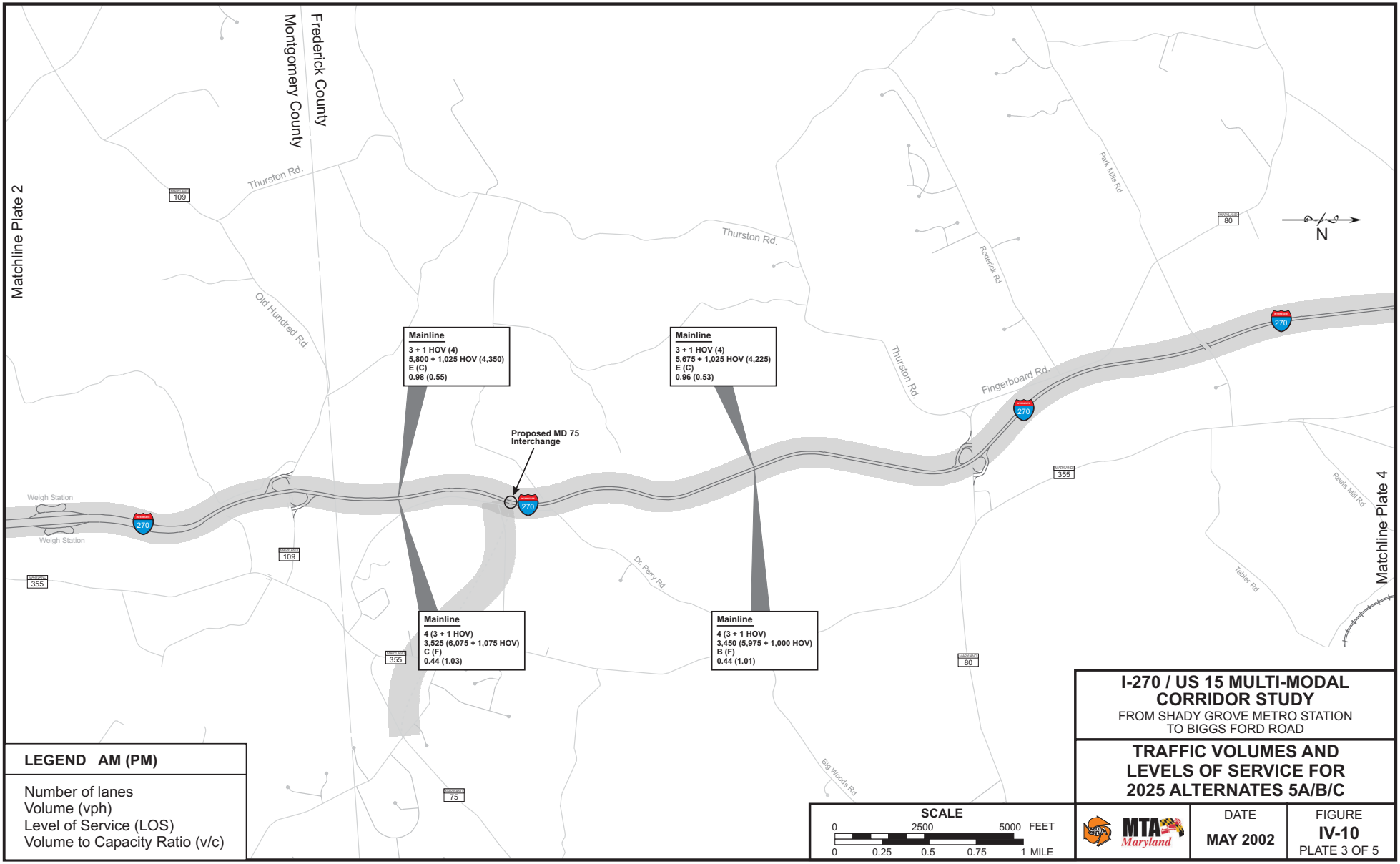
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 5A/B/C

MTA Maryland

DATE: MAY 2002

FIGURE: IV-10

PLATE 2 OF 5



LEGEND AM (PM)

Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)

SCALE

0 2500 5000 FEET

0 0.25 0.5 0.75 1 MILE

I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

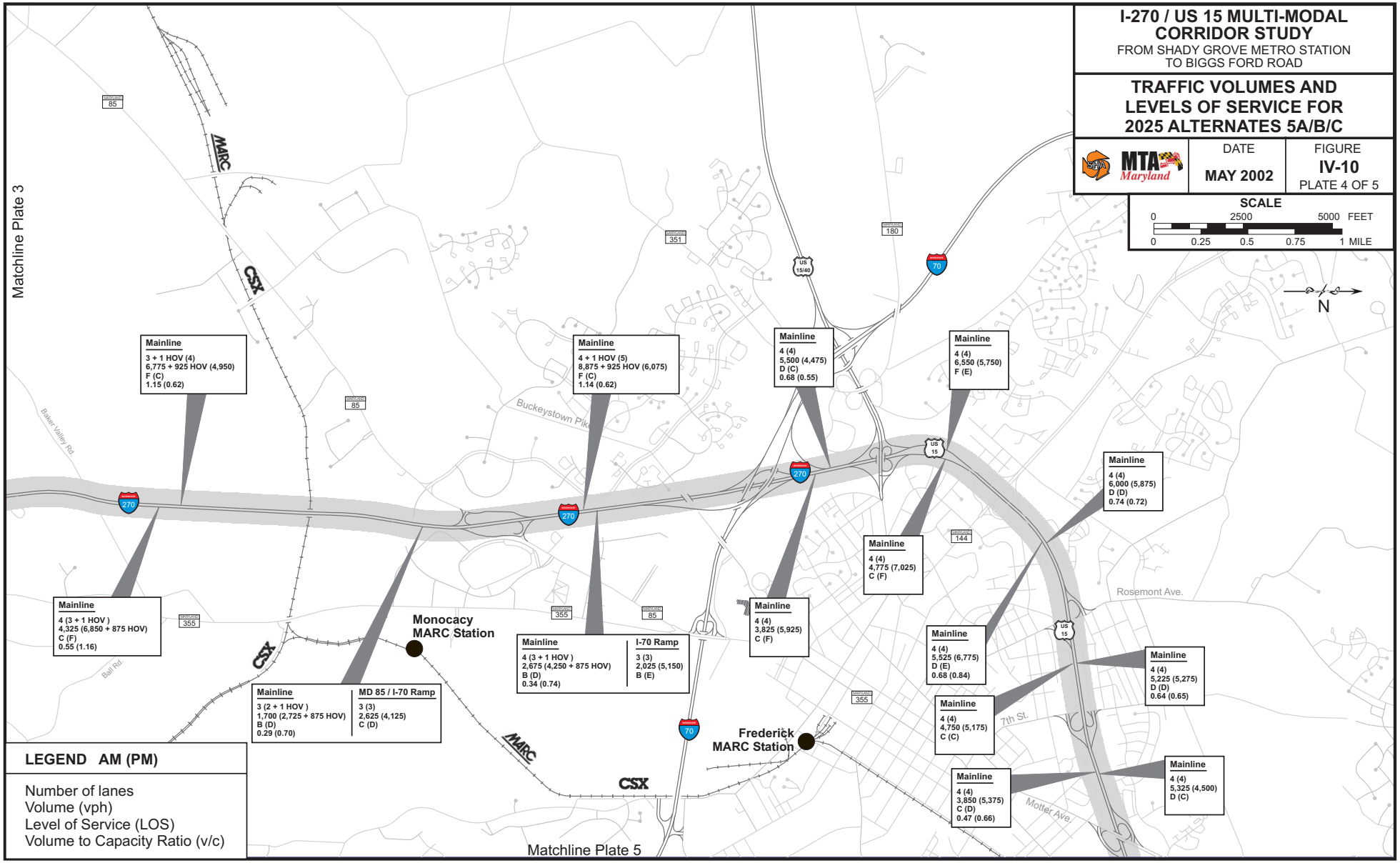
FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

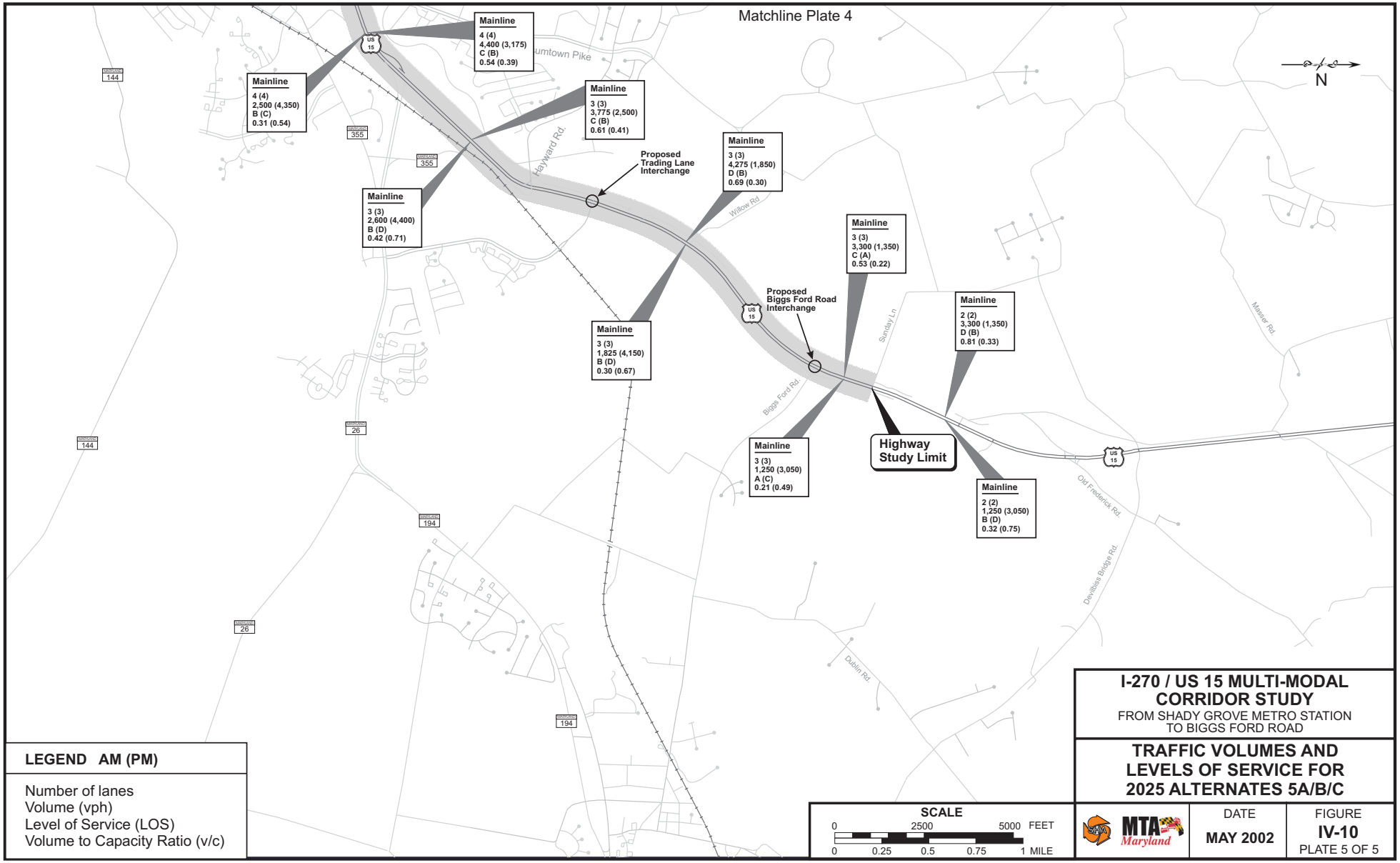
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 5A/B/C

MTA Maryland

DATE
MAY 2002

FIGURE
IV-10
PLATE 3 OF 5


I-270 / US 15 MULTI-MODAL CORRIDOR STUDY
FROM SHADY GROVE METRO STATION TO BIGGS FORD ROAD
TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 5A/B/C
MTA Maryland
DATE
MAY 2002
FIGURE
IV-10
PLATE 4 OF 5
SCALE
0 2500 5000 FEET
0 0.25 0.5 0.75 1 MILE
N
Matchline Plate 3
Matchline Plate 5
Mainline
3 + 1 HOV (4)
6,775 + 925 HOV (4,950)
F (C)
1.15 (0.62)
Mainline
4 + 1 HOV (5)
8,875 + 925 HOV (6,075)
F (C)
1.14 (0.62)
Mainline
4 (4)
5,500 (4,475)
D (C)
0.68 (0.55)
Mainline
4 (4)
6,550 (5,750)
F (E)
Mainline
4 (4)
6,000 (5,875)
D (D)
0.74 (0.72)
Mainline
4 (4)
4,775 (7,025)
C (F)
Mainline
4 (4)
3,825 (5,925)
C (F)
Mainline
4 (3 + 1 HOV)
4,325 (6,850 + 875 HOV)
C (F)
0.55 (1.16)
Mainline
4 (3 + 1 HOV)
2,675 (4,250 + 875 HOV)
B (D)
0.34 (0.74)
I-70 Ramp
3 (3)
2,025 (5,150)
B (E)
Mainline
3 (2 + 1 HOV)
1,700 (2,725 + 875 HOV)
B (D)
0.29 (0.70)
MD 85 / I-70 Ramp
3 (3)
2,625 (4,125)
C (D)
Mainline
4 (4)
5,525 (6,775)
D (E)
0.68 (0.84)
Mainline
4 (4)
5,225 (5,275)
D (D)
0.64 (0.65)
Mainline
4 (4)
4,750 (5,175)
C (C)
Mainline
4 (4)
3,850 (5,375)
C (D)
0.47 (0.66)
Mainline
4 (4)
5,325 (4,500)
D (C)
Monocacy MARC Station
Frederick MARC Station
MARC
CSX
Buckeystown Pike
Bauer Valley Rd.
Bail Rd.
Rosemont Ave.
7th St.
Motter Ave.
LEGEND AM (PM)
Number of lanes
Volume (vph)
Level of Service (LOS)
Volume to Capacity Ratio (v/c)



I-270 / US 15 MULTI-MODAL CORRIDOR STUDY

FROM SHADY GROVE METRO STATION
TO BIGGS FORD ROAD

TRAFFIC VOLUMES AND LEVELS OF SERVICE FOR 2025 ALTERNATES 5A/B/C

MTA Maryland

DATE
MAY 2002

FIGURE
IV-10
PLATE 5 OF 5

TABLE IV-15
RAMP TERMINAL INTERSECTIONS

Site	Intersection	2025 No-Build				2025 Build Alternates 3A/B				2025 Build Alternates 5A/B/C			
		AM		PM		AM		PM		AM		PM	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
1	I-270 northbound to MD 117	F	1.83	F	1.70	F	1.20	F	1.91	F	1.23	F	1.91
2	I-270 southbound to MD 117	F	2.45	F	1.89	F	1.72	F	1.55	F	1.75	F	1.59
3	I-270 northbound Off Ramp at MD 124	N/A	N/A	N/A	N/A	F	1.28	F	1.58	F	1.29	F	1.61
4	I-270 southbound Off Ramp at MD 124	N/A	N/A	N/A	N/A	F	1.04	F	1.03	F	1.04	D	0.90
5	I-270 northbound Off Ramp at Watkins Mill Road	N/A	N/A	N/A	N/A	F	1.17	F	1.24	F	1.17	F	1.19
6	I-270 southbound On Ramp at Watkins Mill Road	N/A	N/A	N/A	N/A	D	0.83	C	0.74	D	0.85	C	0.79
7	I-270 southbound Off Ramp at Watkins Mill Road	N/A	N/A	N/A	N/A	F	1.13	E	0.99	F	1.17	F	1.04
8	I-270 northbound Off Ramp at Middlebrook Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	I-270 southbound On Ramp at Middlebrook Road	F	1.31	F	1.19	F	1.39	F	1.32	F	1.41	F	1.32
10	I-270 northbound Off Ramp at MD 118	F	1.50	D	0.86	F	1.57	F	1.48	F	1.57	F	1.50
11	I-270 southbound Off Ramp at MD 118	F	1.16	F	1.02	F	1.13	F	1.10	F	1.14	F	1.12
12	I-270 northbound Off Ramp at Father Hurley Blvd.	A	0.45	A	0.39	B	0.68	C	0.74	B	0.70	C	0.75
13	I-270 southbound Off Ramp at Father Hurley Blvd.	A	0.52	A	0.56	D	0.86	B	0.66	D	0.84	B	0.67
14	I-270 northbound Off Ramp to Newcut Road	N/A	N/A	N/A	N/A	F	1.13	F	1.37	F	1.13	F	1.40
15	I-270 southbound Off Ramp to Newcut Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
16	I-270 northbound Off Ramp at MD 121	F	1.11	F	1.01	C	0.81	B	0.67	B	0.68	B	0.72
17	I-270 southbound Off Ramp at MD 121	F	1.64	F	1.28	E	0.94	C	0.80	E	0.94	C	0.75
18	I-270 northbound Off Ramp at MD 109	F	1.20	F	1.91	B	0.68	C	0.75	B	0.64	E	0.99
19	I-270 southbound Off Ramp at MD 109	F	1.38	E	0.94	D	0.84	A	0.62	D	0.83	C	0.73
20	I-270 northbound Off Ramp at MD 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	I-270 southbound Off Ramp at MD 75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	I-270 northbound Off Ramp at MD 80	F	1.26	F	1.10	F	1.43	F	1.38	F	1.45	F	1.36
23	I-270 southbound Off Ramp at MD 80	F	1.41	F	1.14	F	2.36	F	1.88	F	2.39	F	1.86

TABLE IV-15 (CONTINUED)
RAMP TERMINAL INTERSECTIONS

Site	Intersection	2025 No-Build				2025 Build Alternates 3A/B				2025 Build Alternates 5A/B/C			
		AM		PM		AM		PM		AM		PM	
		LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C
24	I-270 northbound Off Ramp at MD 85	A	0.46	C	0.76	A	0.61	F	1.34	A	0.52	F	1.12
25	I-270 southbound Off Ramp at MD 85	A	0.56	C	0.73	C	0.76	D	0.87	C	0.79	C	0.76
26	US 40 northbound Off Ramp at MD15/340	E	0.99	A	0.55	F	1.03	E	0.92	F	1.03	E	0.91
27	US 40 southbound Off Ramp at MD15/340	N/A	N/A	N/A	N/A	F	1.48	F	1.40	F	1.47	F	1.38
28	US 15 northbound Off Ramp at MD 144	E	0.95	F	1.01	E	0.92	E	0.92	E	0.95	E	0.93
29	US 15 southbound Off Ramp at MD 144	A	0.46	C	0.77	A	0.46	E	0.91	A	0.47	E	0.91
30	US 15 northbound Off Ramp at Rosemont Avenue	F	1.24	F	1.65	F	1.54	F	1.97	F	1.57	F	1.92
31	US 15 southbound Off Ramp at Rosemont Avenue	A	0.60	D	0.82	E	0.95	F	1.00	E	0.96	F	1.05
32	US 15 northbound Off Ramp at 7th Street	C	0.72	F	1.02	D	0.87	F	1.28	D	0.84	F	1.23
33	US 15 southbound Off Ramp at 7th Street	F	1.05	E	1.00	F	1.07	F	1.13	F	1.02	F	1.11
34	US 15 northbound Off Ramp at Motter Avenue/Opossumtown Pike	C	0.72	E	0.94	F	1.22	F	1.32	F	1.26	F	1.37
35	US 15 southbound Off Ramp at Motter Avenue/Opossumtown Pike	F	1.30	E	0.98	E	0.94	D	0.90	E	0.91	D	0.90
36	US 15 northbound at MD 26	F	1.58	F	1.29	F	1.04	C	0.72	F	1.02	B	0.71
37	US 15 southbound at MD 26	F	1.37	F	1.48	F	1.01	E	0.96	E	1.00	E	0.92
38	US 15 northbound at Hayward Road	F	1.68	F	1.53	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
39	US 15 southbound at Hayward Road	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
40	US 15 northbound at Trading Lane	F	1.52	F	1.41	D	0.83	D	0.90	D	0.83	D	0.87
41	US 15 southbound at Trading Lane	F	1.52	F	1.41	E	0.91	F	1.01	E	0.91	E	1.00
42	US 15 northbound at Willow Road	F	1.57	F	1.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
43	US 15 southbound at Willow Road	F	1.57	F	1.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
44	US 15 northbound at Biggs Ford Road	F	1.86	F	1.54	D	0.89	B	0.69	D	0.89	B	0.69
45	US 15 southbound at Sunday's Lane	N/A	N/A	N/A	N/A	A	0.41	A	0.53	A	0.44	A	0.53
46	US 15 southbound at Biggs Ford Road	N/A	N/A	N/A	N/A	E	0.97	D	0.84	F	1.00	D	0.84

Note: *Shaded rows indicate those intersections evaluated in more detail in this study.*

Intersection LOS for planning studies in Maryland is assessed using the Critical Lane Volume (CLV) technique. This technique assesses congestion using potential conflicts at signalized intersections. Thus, the resulting critical lane volume is a measure of the number of potential conflicts during the hour being analyzed. The critical lane volume that is produced from the analysis corresponds to the following levels of service and volume to capacity ratios:

Critical Lane Volume Total	Level of Service	Volume to Capacity (v/c) Ratio
< 1,000	A	< 0.63
1,000 to 1,150	B	0.63 to 0.72
1,150 to 1,300	C	0.72 to 0.81
1,300 to 1,450	D	0.81 to 0.91
1,450 to 1,600	E	0.91 to 1.00
> 1,600	F	> 1.00

Analyses have been completed for the existing (1998) conditions, 2025 No-Build/TSM/TDM, and each of the build alternates. It should be noted that build alternates 3A/B and 4A/B possess identical traffic volume forecasts for the intersections evaluated. **Table IV-16** presents existing and projected CLV for selected intersections in the project area. The total number of 1998 intersections with CLV less than 1,600 (the threshold value for LOS F) during the AM and PM peak hours is 17. The total number of 2025 intersections in the No-Build condition with CLV less than 1,600 during the AM and PM peak hours decreased to two.

It should also be noted that the intersections of Muddy Branch Road/Great Seneca Highway and MD 117/MD 124 would experience additional delays due to options for the transitway crossings at grade. These two intersections would require additional time for the LRT or BRT vehicles to travel through the intersection at-grade (assuming signal pre-emption for both intersections. A signal phase length of approximately 60 seconds for the LRT vehicles to travel through the intersections was analyzed. The 60 seconds includes the time before the train arrives at the intersection (23 seconds); time for the train to travel through the intersection (30 seconds); and a clearance time after the train travels through the intersection (7 seconds).

TABLE IV-16
EXISTING (1998) AND PROJECTED 2025 CLV FOR SELECTED INTERSECTIONS IN PROJECT AREA

Corridor Intersections

	Corridor Intersection	AM/PM	Existing (1998)		2025 No-Build		2025 Alternates 3A/B and 4A/B		2025 Alternates 5A/B/C	
			CLV	LOS Total	CLV	LOS Total	CLV	LOS Total	CLV	LOS Total
1	MD 355/ Shady Grove Road	AM	1,691	1.06	2,360	1.48	2,430	1.52	2,330	1.46
		PM	1,677	1.05	2,243	1.40	2,363	1.48	2,310	1.44
2	Fields Road/ Sam Eig Highway	AM	941	0.59	1,865	1.17	1,780	1.11	1,800	1.13
		PM	902	0.56	2,405	1.50	2,310	1.44	2,330	1.46
3	Muddy Branch Road/ Great Seneca Highway	AM	1,815	1.13	2,101	1.31	2,301	1.44	1,816	1.14
		PM	1,859	1.16	2,805	1.75	2,350	1.57	2,773	1.73
4	MD 117/Perry Parkway	AM	2,200	1.37	1,873	1.17	1,490	0.93	1,515	0.95
		PM	2,318	1.45	2,195	1.37	1,838	1.15	1,890	1.18
5	MD 117/MD 124	AM	1,225	0.77	1,958	1.22	1,689	1.06	1,768	1.10
		PM	1,630	1.02	2,505	1.57	2,135	1.33	2,338	1.46
6	MD 355/MD 124	AM	1,755	1.10	2,443	1.53	2,484	1.55	2,538	1.59
		PM	1,900	1.19	3,128	1.95	3,093	1.93	2,888	1.80
7	MD 355/ Watkins Mill Road	AM	581	0.36	1,971	1.239	2,104	1.31	2,182	1.36
		PM	862	0.54	2,508	1.57	2,255	1.41	2,388	1.49
8	MD 355/ Middlebrook Road	AM	1,834	1.15	2,488	1.55	2,415	1.51	2,506	1.57
		PM	1,509	0.94	3,060	1.91	3,084	1.93	2,961	1.85
9	MD 118/ Middlebrook Road	AM	880	0.55	1,776	1.11	2,143	1.34	1,813	1.13
		PM	996	0.62	2,178	1.36	2,073	1.30	2,073	1.30
10	MD 118/ Observation Drive	AM	623	0.39	1,850	1.16	1,793	1.12	1,813	1.13
		PM	716	0.45	1,850	1.16	1,768	1.10	1,789	1.12
11	MD 118/ Crystal Rock Drive	AM	882	0.55	1,716	1.07	2,220	1.39	1,908	1.19
		PM	1,499	0.94	2,913	1.82	3,018	1.89	2,998	1.87
12	Father Hurley Boulevard/ MD 355	AM	1,220	0.76	2,956	1.85	3,280	2.05	3,419	2.14
		PM	1,025	0.64	2,519	1.57	2,196	1.37	2,285	1.43
13	MD 121/MD 355	AM	1,206	0.75	3,859	2.41	3,716	2.32	3,695	2.31
		PM	949	0.59	3,055	1.91	2,580	1.61	2,583	1.61
14	MD 26/Trading Lane	AM	903	0.56	1,430	0.89	2,228	1.39	2,214	1.38
		PM	1,119	0.70	1,784	1.11	2,478	1.55	2,521	1.58
15	Spectrum Drive/MD 85	AM	494	0.31	1,021	0.64	1,434	0.90	1,361	0.85
		PM	1,454	0.91	1,795	1.12	2,015	1.26	1,780	1.11
16	Jefferson Street/ Prospect Boulevard	AM	1,064	0.66	1,751	1.09	1,789	1.12	1,803	1.13
		PM	882	0.55	1,460	0.91	1,323	0.83	1,309	0.82

TABLE IV-16 (CONTINUED)
EXISTING (1998) AND PROJECTED 2025 CLV FOR SELECTED INTERSECTIONS IN PROJECT AREA

Ramp Terminal Intersections

	Ramp Terminal Intersection	AM/PM	Existing (1998)		2025 No-Build		2025 Alternates 3A/B and 4A/B		2025 Alternates 5A/B/C	
			CLV	LOS Total	CLV	LOS Total	CLV	LOS Total	CLV	LOS Total
1	I-270 southbound Ramp/ MD 117	AM	2,424	1.52	3,925	2.45	2,750	1.72	2,800	1.75
		PM	2,965	1.85	3,025	1.89	2,475	1.55	2,550	1.59
2	I-270 northbound Ramp/ MD 118	AM	1,461	0.91	2,405	1.50	2,505	1.57	2,519	1.57
		PM	1,376	0.86	1,370	0.86	2,368	1.48	2,393	1.50
3	I-270 southbound Ramp/ MD 118	AM	1,244	0.78	1,849	1.16	1,813	1.13	1,828	1.14
		PM	1,341	0.84	1,636	1.02	1,759	1.10	1,788	1.12
4	I-270 southbound Ramp/ MD 121	AM	126	0.08	2,625	1.64	1,500	0.94	1,500	0.94
		PM	301	0.19	2,050	1.28	1,275	0.80	1,200	0.75
5	I-270 northbound Ramp/ MD 121	AM	397	0.25	1,779	1.11	1,295	0.81	1,080	0.68
		PM	206	0.13	1,619	1.01	1,064	0.67	1,144	0.72
6	I-270 northbound Ramp/ MD 80	AM	438	0.27	2,010	1.26	2,290	1.43	2,315	1.45
		PM	709	0.44	1,760	1.10	2,200	1.38	2,175	1.36
7	I-270 southbound Ramp/ MD 80	AM	N/A	N/A	2,250	1.41	3,775	2.36	3,825	2.39
		PM			1,825	1.14	3,000	1.88	2,975	1.86
8	I-270 southbound Ramp/ MD 85	AM	N/A	N/A	900	0.56	1,210	0.76	1,270	0.79
		PM			1,165	0.73	1,385	0.87	1,210	0.76
9	US 15 southbound Ramp/ Rosemont Ave.	AM	615	0.38	968	0.60	1,522	0.95	1,535	0.96
		PM	741	0.46	1,316	0.82	1,600	1.00	1,675	1.05
10	US 15 northbound Ramp/ Rosemont Ave.	AM	1,370	0.86	1,985	1.24	2,465	1.54	2,506	1.57
		PM	1,610	1.01	2,640	1.65	3,155	1.97	3,074	1.92
11	US 15 southbound Ramp/ 7th Street	AM	968	0.61	1,681	1.05	1,707	1.07	1,632	1.02
		PM	1,211	0.76	1,600	1.00	1,811	1.13	1,783	1.11
12	US 15 northbound Ramp/ 7th Street	AM	N/A	N/A	1,150	0.72	1,385	0.87	1,340	0.84
		PM			1,632	1.02	2,050	1.28	1,968	1.23

5. Park and Ride Lots and Transit Station Parking

a. Park and Ride Lots

Park and ride lots exist or are planned (as noted) directly along the I-270/US 15 corridor at the following locations (as part of separate SHA/county efforts): I-270/MD 117 interchange northeast quadrant (proposed); I-270/MD 124 southwest quadrant (existing); I-270/MD 121 northwest quadrant (proposed); MD 80 northeast and southeast quadrants (existing); Francis Scott Key Mall (existing).

Park and ride lots are being considered in each of the proposed alternates (Alternates 2, 3A/B, 4A/B, 5A/B/C) based on a park and ride feasibility study developed for the SHA in October 1997 (I-270 Park and Ride Site Identification Study). Preliminary concepts have been developed at three locations in Frederick County, including the northeast quadrant of the US 15/MD 26 interchange; the northwest quadrant of the proposed US 15/Trading Lane interchange; and the northwest quadrant of the proposed US 15/Biggs Ford Road interchange. Additional park and ride lots may be considered in the following locations: along Observation Drive in Montgomery County; in the northeast quadrant of the proposed I-270/MD 75 extended interchange in Frederick County; in the southwest quadrant loop ramp of the US 15/MD 144 interchange in Frederick County; and in the Frederick Shopping Center, located in the northwest quadrant of the US 15/7th Street interchange in the City of Frederick. These potential lots may be considered further as the study progresses or if SHA, MTA, or the counties decide to pursue them in advance of this study's completion.

b. Transit Station Parking

Table IV-17 provides transit station parking demand and proposed capacity for proposed LRT, BRT and Premium Bus stations. As summarized in **Table IV-1**, the travel demand forecasts assumed unconstrained parking capacity with no parking charges at the proposed stations. There is sufficient parking capacity to meet the demand at most of the stations. The Decoverly and School Drive stations would be short by approximately 750 to 1,050 spaces to meet the demand of the LRT and BRT Alternates. Parking demand at the Dorsey Mill and COMSAT stations will exceed supply by approximately 300 spaces for the LRT Alternate. Parking at the Shady Grove Station will be accommodated by expanded Metrorail parking. However, the access mode cannot be determined since station shares parking with Metrorail.

TABLE IV-17
TRANSIT STATION PARKING REQUIREMENTS

Station Location		Parking Capacity	Parking Demand by Alternate		
First Station	Last Station		Alternates 3A/4A/5A (LRT)	Alternates 3B/4B/5B (BRT)	Alternate 5C (Premium Bus)
Shady Grove[1]	Shady Grove	N/A	N/A	N/A	N/A
East Gaither (King Farm)	Washingtonian	450	80	200	N/A
Decoverly	School Drive	250	1,300	1,000	N/A
Quince Orchard	Metropolitan Grove	1,200	1,300	700	1,300
Germantown	Cloverleaf	1,100	900	200	1,200
Dorsey Mill	COMSAT	1,500	1,800	1,200	1,500
Total		**4,500**	**5,380**	**3,300**	**4,000**

1. Shady Grove Station parking will be accommodated by expanded Metrorail parking. Cannot determine access mode since station shares parking with Metrorail.

Source: *MWCOG Travel Forecasts 4/2001 – 7/2001*

6. Highway Conclusions

As can be seen from **Table IV-13** and **Table IV-16**, the LOS along mainline I-270 and US 15, and at the corridor and ramp terminal intersections, will degrade significantly over the next 25 years. In general, the 2025 No-Build scenario results in LOS E/F conditions along mainline I-270/US 15 and at the corridor and ramp terminal intersections during the AM and PM peak periods.

With the proposed highway improvements (Alternates 3A/B, 4A/B, and 5A/B/C), the Montgomery County mainline and C-D lane sections of I-270 will continue to be congested, operating at LOS E/F conditions during the AM and PM peak periods. However, the corridor and ramp terminal intersections are expected to operate above capacity.

The Frederick County mainline section of I-270 will also continue to operate at LOS E/F conditions during the 2025 AM and PM peak periods. In general, the section of I-270 between MD 121 and I-70 will operate at LOS E/F conditions regardless of the proposed number of lanes (six lanes in each direction in Alternates 3A/B and 4A/B versus eight lanes in each direction in Alternates 5A/B/C). This is due to the travel demand projections which show that additional capacity improvements made along I-270 result in additional traffic volumes along the corridor. There are some minor improvements in traffic LOS along southbound I-270 in Alternates 4A/B and 5A/B/C versus Alternates 3A/B (LOS E versus LOS F, respectively) due to these alternates having three general-purpose lanes in each direction, while Alternates 3A/B have only two general-purpose lanes in each direction (note that Alternates 5A/B/C also have an additional HOV lane in each direction).

The general trend along US 15 through the City of Frederick is that traffic conditions will improve over the No-Build conditions with the proposed build alternates and will be consistent

with the existing traffic conditions. All three of the build alternates yield similar results along US 15 due to the fact that the proposed alternates are identical in this segment.

The overall traffic analyses show that I-270 and US 15 will continue to be congested (with the proposed build alternates) to 2025 and beyond due to the existing and projected growth along the corridor. However, the build alternates do provide congestion relief in that projected traffic operations would be worse with the No-Build conditions. For instance, reviewing the difference in mainline segment miles that operate under LOS F between the build alternatives and No-Build conditions illustrates this congestion relief, as indicated in **Table IV-18**:

TABLE IV-18
I-270/US 15 LEVEL OF SERVICE IMPROVEMENTS

	Alternates 1 & 2 (No-Build & TSM/TDM)	**Alternates 3A/B**	**Alternates 4A/B**	**Alternates 5A/B/C**
Year 2025 Mainline Segment Mileage of LOS F Conditions [1]				
I-270/US 15 Northbound (PM Peak Hour)	25	18	14	18
I-270/US 15 Southbound (AM Peak Hour)	25	21	13	14
Total Mileage of LOS F Segments	**50**	**39**	**27**	**32**
Year 2025 Mileage Reduction of LOS F Segments from No-Build and TSM/TDM Alternates				
I-270/US 15 Northbound (PM Peak Hour)	N/A	7	11	7
I-270/US 15 Southbound (AM Peak Hour)	N/A	4	12	11
Total Mileage Reduction of LOS F Segments	**N/A**	**11**	**23**	**18**

Note: 1. Total I-270/US 15 corridor length is approximately 31 miles.

Alternates 3A/B would provide an eleven mile total reduction in the mainline segments operating at LOS F (seven miles reduction northbound, four miles reduction southbound). Alternates 4A/B would provide a 23 mile total reduction in the mainline segments operating at LOS F (eleven miles reduction northbound, twelve miles reduction southbound). Alternates 5A/B/C would provide an 18 mile total reduction in the mainline segments operating at LOS F (seven miles reduction northbound, eleven miles reduction southbound). Therefore, Alternates 4A/B offer the greatest reduction in miles of LOS F along the corridor, Alternates 5A/B/C offer the second most reduction, and Alternates 3A/B offer the least amount of congestion relief compared to the expected No-Build conditions.

F. MULTI-MODAL CONCLUSIONS

The travel demand modeling results concluded that the limited capacity on I-270 in Alternates 3A/B and 4A/B (six lanes on I-270 between MD 121 and I-70 in Alternates 3A/B and 4A/B versus eight lanes in Alternates 5A/B/C) does not affect the transit ridership. In addition, none of the transit modes provide a significant positive impact on the highway travel demand; however, the proposed build alternates do provide additional mobility and modal options with free-flow conditions and consistent travel times. A multi-modal approach is a prudent option for the corridor since the different highway and transit modes under consideration serve different travel markets and trip origins and destinations.